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23 January 1978

USSR

EAST EUROPE

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS, AND AUTOMATION TECHNOLOGY

No. 30

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CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 30

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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A. General Treatment

USSR

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METHODS AND PROSPECTS FOR DEVELOPING AN INFORMATION SYSTEM IN THE POLISH PEOPLE'S REPUBLIC IN 1976-1980

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA, SERIYA 1 in Russian No 4, 1977 pp 22-26 manuscript received 6 Dec 76

DERENTOVICH, M., Polish People's Republic

[Abstract] In this article are discussed the future extension of the Polish Information Service and the formation of a Scientific, Technical, and Organizational Information System (SNTOI) with a view toward incorporation of this system in the International System of Scientific and Technical Information (MSNTI) in cooperation with member countries of CEMA, including the USSR, GDR, CSSR, and the Hungarian People's Republic. Emphasis is on the type of documents and information the system will handle and on the need for computer hardware, specifically YeS-series computers, and microfilming equipment. Information services in Poland are presently coordinated by the Center for Scientific, Technical, and Economic Information, which is under the Ministry of Science, Higher Education, and Technology. Whereas there were 1,850 information agencies in the country in 1975, there will be 4,590 by 1980. During 1975-1980 it is planned that the SNTOI will gather, store, process, and disseminate information sources from the holdings of libraries and information agencies, including books and brochures, journals and newspapers, cartographic and graphic materials, scientific-and-technical and educational films, microfilms and photocopies, patent and company literature, standards, and technical documentation. The stated purpose of the SNTOI is to improve and increase the efficiency of the information exchange process between scientists and production personnel and scientists and administrative agencies, as well as between various individuals involved in production. The SNTOI will make possible access of all its users to the most complete information bank in the world, with high-quality information service and the lowest costs possible for gathering, processing, and disseminating information. The system will be subdivided functionally to cover special subject-oriented material and different geographical areas, and on the organizational level it will make possible creation of a network of information agencies and a master system. Specialized systems within the SNTOI will process published documentation; scientific research papers begun, in process, and completed; scientific and technical translations; material from conferences, congresses, and exhibitions; materials on international cooperation; trade and technological literature; patent documents; standards and specifications; archives; and materials and equipment supply documentation. In addition to creation of the SNTOI, the Polish Information Service is working on a system of forecasting the development of scientific and technical information in Poland up to the year 2000, tying this forecast in with a forecast of socioeconomic development. This forecast will begin in 1977 and be revised in accordance with new data in future years. Preparations are also being made to educate personnel in library science and information science at all educational levels. Educational projects will receive the assistance of the Institute of Raising the Qualifications of Information Service Personnel (IPKIR) in Moscow, enabling participation of Polish specialists in the MSNTI. A special center for educating information service personnel will be under way by 1980.

POLAND

COMPUTER NETWORKS

Warsaw INFORMATYKA in Polish Vol 12 No 2, Feb 77 pp 1-5

BAZEWICZ, MIECZYSLAW, Wroclaw Polytechnic

[Abstract] A description is given of the overall development of computer networks, their hardware and software, their use and functions, parameters and design. The author concludes that in Poland, the rapid progress in computerization and the increasing number of the multiaccess computer systems being installed in the higher educational system (WASC, CYFRONET) and in industry, and the quantitative and qualitative development of hardware and software, create favorable conditions, as well as the necessity, for the creation of computer networks. The work has already been undertaken for the realization of the intercollegiate network Wroclaw-Warsaw-Krakow and of similar networks for the use of administration and industry. One of the basic factors responsible for the progress in this field is the qualitative development of Polish telecommunication facilities in which many notable successes have recently been achieved. Plans are also being made to connect the Polish computer network with those of other socialist countries and with European countries. This cooperation is concerned with the conception of the networks planned within the framework of the International Commission of Cooperation of the Academies of Sciences of Socialist Countries in the field of information science, and of the International Institute of Applied Systems Analysis (IIASA) in Australia, which is engaged in building a common network for socialist countries and mid-European countries, and with the conception relative to the cooperation of the Polish intercollegiate computer network with the CYCLADES network. Figures 3; references 4: 1 Polish, 3 Western.

CZECHOSLOVAKIA

OPERATING SYSTEM GEORGE 3

Bratislava INFORMACNE SYSTEMY in Czech Vol 6 No 2, Jun 77 pp 165-176

JINOCH, JOSEF, Computer Center of CKD, Prague

[Abstract] The system George 3 was developed for computers of the higher type of the ICL 1900 series. Use of this system at the CKD engineering works computer center at Prague is discussed. The computer used was an ODRA 1305 unit. The George 3 (G 3) program is provided with a constant supervisor in a non-interruptible circuit, and is provided with a multiple access arrangement. The system is suitable for all computers of the 1900 type; it operates in an interruptible circuit. Control of the access to its memory system by the users of the program is provided. Usable programs and stored data are held in a file-store. The system information directory lists all legitimate

users of the system. The system allocates time to respective users and transmits the programs for operational solutions. Execution of a program may be based on information stored in the memory system, or the operation may be controlled from the terminal of the user. The type and the parameters of operation are determined by the command code. Execution of complex tasks is controlled by macro-commands stored in the memory. After time was allocated to a user, the memory of the system is connected, multiple-on-line programming initiated, the operation performed, and connection interrupted at a command from the terminal. The input and output for the system may be stored on punched cards. One part of the G 3 system is an editor which can convert a system of old commands into a modified new system. The G 3 system allows access from several terminals simultaneously for the execution of individual programs. Each of the users must introduce himself in the prescribed manner. The G 3 system automatically records the charges for the work performed on behalf of the individual users who have access to the system. The system is provided with a low level scheduler which assigns the suitable time slots for programs solved by the computer. Its high level scheduler assigns suitable functions of the computer required for individual solution steps. It is concerned with access to the memory and with the computing power index. Part of the G 3 system is concerned with the library of magnetic tapes available for the system. The G 3 system is composed in an assembler type language with some features giving facilities for fast translation. The efficiency of operation of the system is controlled by the installation parameters. There are several features of the system which assure operation without an undue amount of breakdowns. Adaptation of the G 3 system for the ODRA 1305 computer required about 2 man-years. The work was undertaken at CKD Prague because the staff of the ODRA works in Poland could not assure its realization. The G 3 system allows a fuller utilization of the available computer facilities. Figure 1; references 7: 2 Czech, 5 Western.

USSR

SOME PROBLEMS IN DEVELOPMENT OF AUTOMATED MANAGEMENT SYSTEMS IN THE 10TH FIVE-YEAR PLAN PERIOD

Moscow EKONOMIKA I MATEMATICHESKIYE METODY in Russian No 5, Sep/Oct 77 pp 1085-1092 manuscript received 3 Jun 77

CHESENKO, N. I., Moscow

[Abstract] A general, broadly encompassing report is given on the status of automation of management processes by the use of computer technology in all spheres of industry and government. Particular emphasis is placed on the economic benefits of centralized computer facilities and the need for further standardization in the form of packages of general-purpose and special-application programs and for further centralization through administrative restructuring of industry. The efficient use of computer facilities is noted as the most important problem of today. The State Committee of the USSR Council of Ministers on Science and Technology in conjunction with various ministries and departments has formulated fundamental guidelines for employing computers for the purpose of raising the efficiency of national production. ASUP's [automated systems for management of enterprises] made up 60.5 percent of all systems in use at the beginning of the 10th Five-Year Plan. New ASUP's to be introduced in the current five-year plan period will be highly concentrated in the food industry and light industry (as much as 40 percent). Standard design solutions for key ASUP problems and subsystems will be created for implementation on third-generation computers, using certain representative enterprises of individual industries as models for analysis. Work will be begun on creating integrated systems for management of enterprises, which will be called "process systemization" ASU's, which will be tested at 16 representative enterprises. The meeting points between ASUTP's [automated systems for management of technological processes] and ASUP's will be refined, smoothed out, or eliminated through integration, as applies to their methodological, information science, software, and hardware aspects. One of the key problems today is to provide a strong technical-economic basis for automation of management processes; it is not enough to show annual savings, but it is necessary to reveal the mechanism behind the influence of automation of data processing on the production process and on the efficiency of employing labor resources. This problem must be solved by analyzing the underemployment of production resources, finding the reasons for this, and utilizing ASUP's to solve the problem. For example, now workers sometimes stand idle because a shift assignment has not been prepared in time for their arrival on the job. This can be corrected by introducing a program to solve the problem "Preparation of Shift Assignments for Workers" in the ASUP. Group computer centers should be looked into as alternatives to individual computer centers when the latter are economically unfeasible. The group centers will serve small and medium-size enterprises, which comprise 80 percent of the total. The use of multiple-user systems will be investigated further. Computer centers should be regarded as data-processing enterprises which are financially self-supporting; there is presently little consistency

with regard to the administrative structure and financial management of computer centers. There is need for standardization of terminology in program packages and user's manuals; lack of consistency in introducing new concepts relating to management processes has caused great confusion, and the underlying logical structure on which these concepts are based has not been well defined.

USSR UDC 681.3.022

DEVELOPMENT OF SPECIALIZED TERMINALS AS A MEANS OF INCREASING THE EFFECTIVENESS OF AN AUTOMATED MANAGEMENT SYSTEM FOR TECHNOLOGICAL PROCESSES

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 2, Apr/May/Jun 77 pp 63-66 manuscript received after completion 31 May 76

BELOUSOV, K. N., PLAKHOTNYY, N. V., GINAYLO, V. A., and KUPCHENKO, E. V., candidates in technical sciences

[Abstract] Specialized terminals need to be developed for specific industries in order to make ASUTP [automated management system for technological processes] based on M-6000 ASVT-M computers more effective. Specialized terminals can be designed in terms of new physical phenomena and new design solutions (lasers or dynamic screen consoles) and by coupling autonomous instruments and devices to the system. Merits of both terminal types are discussed. The information display terminal developed for the M-6000 has these components: Videoton-340 displays and a Pripamat device, part of a multifunctional input/output terminal. Figures 2.

CZECHOSLOVAKIA

DISCUSSION--CURRENT PROBLEMS OF SOFTWARE

Bratislava INFORMACNE SYSTEMY in Czech Vol 6 No 2, Jun 77 pp 177-188

KRAL, JAROSLAV, Institute of Computer Technology, Czech Technical University, Prague

[Abstract] Software needed for the solution of scientific and economic problems is relatively simple; when FORTRAN and COBOL languages may be used and no interaction with hardware is needed. When mass information networks are developed and computers are used for controls, whole teams of programmers are needed for the operation of the computers. New algorithms and abstractions for the formulation of targets must be prepared. This critical situation in software is the result of very fast developments. Programming requires projections and coordination. It is usually undertaken by an individual; team work for this activity has not yet been developed. Techniques for programming work are just beginning to be developed. Technical programming is concerned with product standards, design methods and means of production control. It is difficult to separate programming into routine and design activities. It is still very difficult to judge the quality of individual programs. The theory of programming is concerned with mathematical problems, an abstract complexity, concrete complexity, formal languages, and the semantics of languages used in programming. Its methods cover the syntax of programming languages, syntax analysis, and the semantics of the languages. Software developments parallel those of computers. Specialized languages are being developed for certain tasks to replace those in general use. Combinations of the two types of languages are also used. The influence of programmers on developments of computer hardware is not as great as it should be. New universal languages are PL/1 and ALGOL 68. The success of ALGOL 68 is caused by the availability of good compilers. A new method of writing compilers is based on various variations of attributed grammars. Languages of higher levels than ALGOL 68 and PL/1 will be developed. The operation systems are controlled by the job control language (JCL) which is becoming more and more complex with the increasing complexity of new computers. The software which conducts the operation of whole networks of computers represents a higher degree of the software of operational systems. New computers are provided with packages of problem-oriented programming systems. Training of programmers in Czechoslovakia is conducted at two levels: the high school level, and the college engineering level. In recent years software for computer ZPA 600, the FEL system, and the software for ADT were developed in Czechoslovakia. Full developmental work in the software is hindered by the absence of a central institute dealing with these problems. References 11: 5 Czech, 6 Western.

USSR

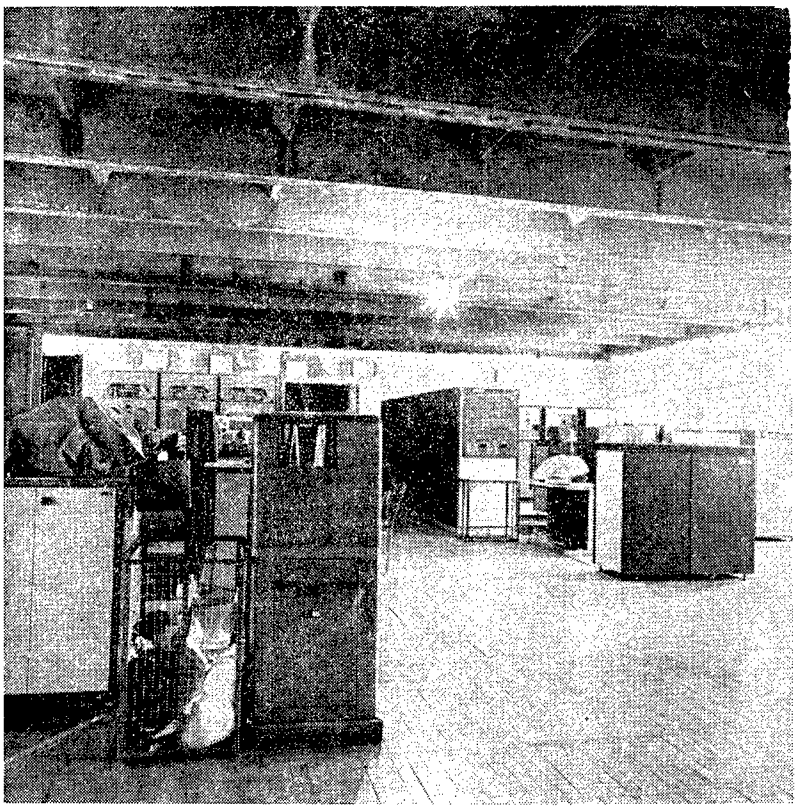
A PHOTO INDICTMENT

Tashkent EKONOMIKA I ZHIZN' in Russian No 6, Jun 77 p 86

[Text] This is already the third year that an expensive modern computer, the YeS-1020, is being used in unprepared premises at the Central Asian Scientific-Research Institute of Economics of Agriculture. To date there is no air conditioning and the computer goes down because of overheating; the data storage disks are not protected from dust. According to data from the Central Statistical Administration of the Uzbek SSR, the institute's computers had a work load of only 3 hours per day last year, given a norm of 15 hours.

A similar situation exists in the institute's Bukhara Department, where since 1974 a Minsk-32 has practically been sitting idle.

In the photograph: this is the appearance of the machine hall of the Central Asian Scientific Research Institute of Economics of Agriculture.



USSR

AUTOMATED INDUSTRIAL CONTROL PROCESSES IN CHEMICAL INDUSTRY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ["System Effectiveness"] 19 Jun 77 p 2

KIRIKOV, G., laboratory chief, Experimental Design Office of Automatics

[Text] Automated Management Systems for Technological Processes (ASUTP) are being utilized to an increasing extent at chemical industry enterprises. These systems make it possible to reduce consumption of raw materials and supplies, to increase output, to improve product quality, and to reduce the number of process personnel.

At the present time there are 56 ASUTP in operation at enterprises of the Ministry of the Chemical Industry; there will be more than 100 of these systems in operation by the end of the 5-year plan. The cost of such systems is fairly high: each costs an average of 2 million rubles. Naturally a high degree of effectiveness is expected of them.

In most cases adoption of an ASUTP produces considerable economic benefits, making it possible fully to recoup system costs within a few years. As an example we can cite the automated system installed at the Novopolotsk Production Association "Polimir." This system is designed for newly constructed high-pressure polyethylene plants. It provides annual savings of almost 500,000 rubles. No less effective are the ASUTP adopted at the Nevinnomyssk Production Association "Azot," at the Ionava Nitrogen Fertilizer Plant and several other enterprises.

But has each system produced the expected benefit? Unfortunately the answer is "no" in many cases. For 2 years now at the Production Association "Uralkaliy" a system has been in operation to automate mine processes, developed at the Kiev Institute of Automation. But the system is producing little benefit: it fails to perform most of its tasks. In particular, it is unable to determine quantity and quality of ore, to monitor main blower output, or to monitor temperature in the shaft. A special Ministry of the Chemical Industry team, which was given the job of checking the status of automation of technological processes at Uralkaliy, concluded that the ASUTP was developed at a low scientific and technical level, that individual subsystems are not intercoordinated, and adequate support data is lacking.

Of course such an unsuccessful ASUTP is an exception. Nevertheless the best of the automated systems are far from perfect. Auxiliary operations which, as we know, involve a high percentage of manual labor, have fallen out of their "orbit." For example, the process of producing sheet from high-impact styrene was automated at the Nelidovo Plastics Plant. But loading of raw materials into the equipment, packing and transfer of finished sheet continue to be manual operations. This is a rather strange situation, to say the least: production is considered automated, and yet a shovel is an essential implement. Why does this happen? In our opinion the reason lies in the fact

that there is no organization in this branch which would deal in a centralized manner with mechanization of auxiliary operations. It is not surprising that they are not "written into" ASUTP.

In large measure the effectiveness of automated systems diminishes because they are sometimes short on system components when installed. The fact that components are not mass-produced. For example, the chemical industry's requirements in sensing elements are being met by only 40-50 percent. There is a definite shortage of instruments for processes with aggressive media and media presenting a fire hazard.

In order to resolve the problem of automating technological processes, it is also essential to improve system equipping with control computer hardware. Systems presently being built are based on employment of computers equipped with various devices with standardized external couplings--processors, input/output devices, data display station, etc. The list of these very expensive devices totals several dozen. This complicates computer servicing and diminishes economic effort.

Mini-computers are highly promising for automating technological processes. Their computation capacity and low cost make it possible to build more economical systems. We believe that the Ministry of Instrument Making, Automation Equipment and Control Systems should speed up their industrial manufacture.

Particular attention should be focused on elaboration of methods development for ASUTP software. At the present time software is developed from scratch for each concrete system. This software is specific and complex. There has long been a need for software standardization. In view of this, there should be a concentration of software development in one of the organizations of the Ministry of Instrument Making, Automation Equipment and Control Systems, the enterprises of which manufacture computer hardware.

We finally come to standard design of ASUTP. This has not yet been accepted in the chemical industry, and yet it is so important that a system developed and designed for a given technological process be applicable to analogous processes. This would reduce the time required to develop systems, would make them more reliable and economical.

USSR

LOSSES CAUSED BY COMPUTER DOWNTIME

Moscow EKONOMICHESKAYA GAZETA in Russian ("Consider the Waste") No 39, Sep 77 p 17

SKRYABIN, M., director of the Planning Department of the Glazovsky regional "Sel'khoztekhnika" [Agricultural Equipment Association], Udmurtskaya Assr.

[Text] Three years ago our Glazovsky regional "Sel'khoztekhnika" acquired an "Elektronika--155" electronic-keyboard computer [EKVM] from the Sverdlovsk Experimental Plant "Spetsavtomatik" (plant number 1379). It was decided to introduce into our operations an advanced method for speeding up the operating calculations and simplifying accounting.

Work really did become easier. But we were not able to be satisfied with the new procedures for long. After exactly 2 years, the machine refused to carry out computations. It had to be repaired.

Our expensive EKVM (the balance of whose cost was not more nor less than 1,435 rubles) had to be sent to the city of Izhevsk. At the specialized repair shop--the Izhevsk section of shop No 1 of the Sverdlovsk Experimental Plant "Spetsavtomatik"--the section foreman Comrade Zaripov took our machine and turned it over at that time for "treatment" to brigade foreman Comrade Ivanov. They told us that they already had one EKVM with similar defects; ours was the second. They named a time; it would be done in a month!

Of course, we believed them. The wait began. But a month went by, then a quarter, until at last a whole year had passed. During this entire time, we made monthly inquiries into the "health" status of the machine, but in answer we heard repeatedly: "There are no spare parts; the factory has not sent us anything."

On the second of August 1977, brigade foreman Ivanov informed us by telephone that there were already more than five such machines awaiting repair. As if to say: "Don't get upset; you aren't alone!"

Of course, these reassurances to us are very little help. Machine calculations are not eased for us but, rather, complicated. Now, in addition (without even having an EKVM for clerical accounting), an account of the losses from making the purchase has to be kept. And they are significant. During these 13 months in which our machine has been waiting to be repaired, the amortization alone came to more than 187 rubles, not to mention the almost monthly telephone conversations and the additional expenditure of working time.

Who should be put to the trouble of providing repair parts for the necessary components and units? The factory? Or are the repair shops themselves guilty in this case? One thing is clear: an expensive procedure should not be retained. Workers guilty of inefficiency should receive the punishment they deserve.

USSR

COMPUTER PERSONNEL TRAINING DEFICIENCIES DISCUSSED

Dushanbe KOMMUNIST TADZHIKISTANA in Russian ["A Problem of Personnel"] 21 Sep 77 p 2

TURSUNOV, L., Rector, People's University, Candidate in Technical Sciences

[Text] On the fifth of November last year in the article, "EVM: Let's Work!," our newspaper analyzed the status of the electronic computer inventory in the republic and its performance. In the article it was stated that expensive machinery was stagnating because of a lack of personnel, incompetence in exploiting the technology, and other causes were pointed out.

On 21 November 1976, the Dushanbe municipal organization of the "Znaniye" Society created the People's University for "Methods of Applied Mathematics in the Control of Production" within the Tadzhikistan Polytechnical Institute.

Here is what the Rector of this university, Lutfullo Tursunov, has to say in his own article.

Today in computing centers and organizations where work is conducted on the creation of ASU [automated management systems] there is not sufficient specialists in programming problems and operation of electronic computers, a system of planning ASU and the theory of organization and management of production...their insufficiency affects the deadlines and the quality of fulfillment of work on the introduction of ASU and electronic computers.

An analysis of the composition of the engineering technical staff of many VTS [computing centers] and ASU reveals that this work is conducted primarily on the strength of retrained specialists.

From 1 to 2 years is spent in retraining, and this is an additional expenditure of State resources.

A similar picture exists for young specialists arriving in this field from the VUS's [Higher Educational Institutions]. Firstly they are few in number, and secondly their level of training leaves much to be desired.

Along with the developers, specialists from the ministries and departments participate in examining the objectives of automation and prepare production for the introduction of ASU, etc. Unfortunately, many of them do not know the basic principles of ASU formation and its role in the management process. Two or three survey lectures cannot reveal to a sufficient degree the methodological problems of ASU creation. A well organized training system is systematically needed in order to raise the level of scientific and technical knowledge.

In short, today the effectiveness of the work in creating ASU and computer utilization largely depends upon regulating a system to raise the level of

skills and retraining of the specialists.

The People's University and a special course play a significant role in this matter. The People's University, "Methods of Applied Mathematics in Production Control," formed in 1976 by the Dushanbe "Znaniye" Society municipal organization under the Tadzhik Polytechnical Institute, is the foundation for elevating the qualifications and retraining of specialists for the ministries, departments, enterprises, and organizations conducting work in ASU and computer.

University students gain skills in the basic principles of ASU synthesis, in the utilization of economic-mathematical methods and in computers in industry.

During the first school year, more than 80 representatives from the ministries, departments, enterprises and organizations from the city of Dushanbe were admitted to the 2 departments, "Computers in Engineering Calculations" and "Economic-Mathematical Methods and Models For Control."

In the practical studies, basically problems suggested by the students themselves and taken from the realm of their production activity are discussed. The value of such an approach lies in the final results acquired in the case of computers and used in practice.

In a brief period, many students learned independently to formulate the definition of problems and program their solutions on third generation computers; they enriched their own knowledge on questions concerning the formation of informational, mathematical and technical ASU support; and they became acquainted with the organizational and legal problems of its introduction.

Here's the opinion of one of them--a senior scientific staff member of the Institute of Chemistry of the Tadzhik SSR Academy of Sciences, D. Khalikov on the results of his own studies at the university: "During a brief period of study, I learned how to select independently the mathematical methods for processing experimental data and to develop a program for its solution on third generation computers.

"I consider that our university is opportunely organized, and in the future will play an important role in the mansgement of propaganda for the present day achievements of science and technology."

Unfortunately, during the first school year, the university experienced great difficulties, especially because of the screening of the students. Several of them, because of weak training, assimilated the material poorly, and supervision was insufficient as viewed from the organization of the studies of their own representatives.

During the new 1977-1978 school year, the assembly of students is being carried out in three departments: "Computers in Engineering Calculations," "Economic-Mathematical Methods and Models in Production Mansgement," and "ASU Program Support." The academic program for the first two departments is designed for 280 hours. Many hours are provided for practical work, programming problems and their solution on third generation computers.

A special-purpose group, "ASU Program Support," has been organized for the purpose of accelerated training for skilled programmers able successfully to operate third generation computers (ES-EVM) and develop a system of mathematical support for ASU at various levels. At present the shortage of such specialists affects the rate of ASU growth and the efficiency of computer utilization in the republic's national economy.

The group's academic program is designed for 400 hours, including an extensive amount of both theoretical and practical work in studying the programming languages, "ASSEMBLER," "COBOL," and PL-1. Furthermore, study of the principles of the use of packets of applied programs in the ASU Software System is envisaged in the plan. The activities here will be conducted for 3 months with selective production breaks.

We are doing everything so that our students will cover the practical instructions in the laboratories for the hardware of ASU devices and in the computer centers equipped with the "Minsk-32," ES-1020, and other EVM.

The instruction will culminate with the completion and proofing of the course projects, the theme of which will be designated with regard to the interests of the enterprises, organizations and the wishes of the students.

Editor's note:

Thus, this business has been moved off dead center, but at what rate? During the 1st year of study, the People's University graduated several tens of students. Let us be reminded, that during this Five-Year Plan, the computer centers (VTs) of the republic must train 1500-1800 people just for normal operations!

The university, undoubtedly, is a useful start, but it is not sufficient to solve the problem of training personnel. GOSPLAN workers from the republic must do this primarily. We must as quickly and actively as possible deal with the quest for an escape from an emergency situation (during 1975, computers were down nearly 20 thousand hours in the republic). As an example of a first step, it would be possible to create in Dushanbe, organized by the "Znaniye" Society, a branch of the Leningrad Institute for the Improvement of Skills in Management Methods and Technology "LIMTU), the staff members of which have come before the university's students. Likely, there are yet other possibilities.

And in the meanwhile, the machines stand idle.....

MULTIPURPOSE COMPUTER FOR INDUSTRY DEVELOPED AT PERM' INSTITUTE

Moscow PRAVDA in Russian ("Machine Designs") 4 May 77 p 2

PIROZHNIKOV, V., VECHERNYAYA PERM' correspondent and CHEREPANOV, V., PRAVDA correspondent

[Text] One of the tasks of the five-year plan is to raise the scientific and technical level of automated management systems. Specialists of the Perm' Scientific-Research Institute for Control of Computers and Systems are working on this.

Let us suppose that you have been charged with designing a new type of walking excavator. Could you assemble it from a bulldozer, or a rolling mill or a drill rig? Of course not, you say, and you would be right.

However, it is explained, there are a multitude of types of bulldozers and dozens of types of rolling mills and drill rigs represented in the files where design documentation for past years is kept. For each type of design there are thousands and thousands of drawings. In order to study them, to select something expedient, a year or more is required. Sighing deeply, you give up your idea and begin to create the excavator out of blank space.

But what if you search and choose documentation with the help of an electronic computer? Examining a million drawings is a snap for it. A part for the excavator in the form of a finished solution can be found in a few minutes! What designer can do so in that time?

The automated selection of acceptable design options from a number of previously prepared solutions is being developed in the country for the first time for the ASU-Uralmash [Automated Management System of the Ural Heavy Machinery Association imeni Sergo Ordzhonikidze], which is being created by Perm' specialists. The deputy chief designer of this system, N. I. Dmitriyev, tells about it:

"The Uralmash Association is an extraordinarily complicated target for the design of an ASU. Ten plants operate here under one signboard, and there is a vast amount of engineering and standards documentation. Some 8 million design drawings alone are stored, occupying a volume equal to a five-story building, so it is practically impossible to locate a drawing of some part or component quickly in this file. It is simpler to design it all over again. Our system reduces the time for the search to minutes. But still the main thing here is neither speed nor size but the capability to offer to the designer prepared design solutions and to enable the wide use of previously accumulated experience."

Using the electronic computer, we decided to find out whether some Uralmash designers had created a drawing of a complicated flange. In order to find out, the machine would have to examine 2 million documents. In just a few minutes after the request, we are given a machine-printed table gram with the code number of a drawing. We go to the "microfile"--an installation

similar to a television screen--and we type on its keyboard the code number indicated. A drawing of the flange sought appears on the screen there.

But what if the required part had never been created? In that case the machine will help the designer. It will not only offer designs of more or less similar parts but it will also break them down by stages and proximity into eight groups. It catches all the most important aspects, even in remote developments. The savings from such an "automatic designer" are more than a million rubles per year.

Aside from the automation of design, the electronic computer at Uralmash can also successfully operate in other work areas which are not traditional for ASU's. This also promises to be of no small benefit. Let us take, for example, such a delicate questions for a marketing subsystem as the observance of deadlines for shipping output. In manufacturing highly complex and expensive items of equipment--walking excavators and rolling mills--Uralmash naturally concludes contracts with its customers in which the shipment deadlines are strictly specified. The customers follow up vigilantly on their observance. If the manufacturers stand around a bit and do not ship the product on time--please, pay a fine. In order to protect the enterprise against such losses, the machine itself will follow up on fulfillment of the order and report ahead of time to management about the threat of failure, giving advance information--a short-term forecast.

And what if the warning still does not help and the deadline proves to be broken? Here also the ASU has its say. For the shipper is not always guilty, even he gets let down. The plant's juridical division sometimes argues the justice of a fine in court. But not in all cases does it manage to be prepared for the trial. For the directives and statutes are changed, supplemented or interpreted almost annually. The sea of paper rises increasingly. Therefore this happens: the plant's lawyers lose out today, but tomorrow they will find in the files a document which can put the matter in an entirely different light. It is vexing, but there is still no satisfaction for the paperwork. Then the computer finds within a few minutes all the data on a certain article of the law; it never misses anything and will always be able to step forth in the role of a unique "automatic lawyer."

"The automation of new management functions heralds further expansion of the potential of modern ASU's," says institute director Ye. D. Kurochkin. "Their effectiveness is determined to a great extent by the set of problems which are solved in the most important subsystems, such as current control, technical preparation for production, planning and quality control. Therefore, an increase in the share of such tasks by ASU's is one of the important trends in the institute's activity. During the last five-year plan our collective created 75 automated systems. The combined economic effect which was obtained as a result of their introduction was more than 25 million rubles. The institute's plans for the Tenth Five-Year Plan include the development of 112 systems, among which an ASU for large scientific and production associations occupies a special place. This is why we strive to make the system at Uralmash the basic and standard model for the whole industry."

USSR

THE COST OF CERTAINTY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian (Report from the Institute of Control Systems, Georgian SSR Academy of Sciences: "The Computer Learns to Listen") 22 May 77 p 4

AROBELIDZE, O., and PIPKO, D., Special Correspondents

[Abstract] Dr in Technical Sciences Otar Kviros'yevich Khomerkin spoke to the correspondents. Today, the only means of communicating with computers is by pushing buttons. Whether the buttons are on a control panel, a video display terminal, a tape puncher or card puncher, buttons must be pushed to communicate with computers. Modern keyboards, even though they no longer make actual electrical connections by the pressing of conductors against other conductors, are not designed so that the slightest touch will cause a character to be entered, with no movement of the key, as certainly could be done; rather, even when not needed, keyboards are designed so that the keys offer some resistance to the touch, actually move downward a fraction of an inch, then suddenly offer much less resistance in a sort of "click," so that the operator actually knows that the correct key which he has pressed has responded, that his information has been entered into the computer or punched on the card or tape. But what, the authors ask in a final question, will be the next device to replace the keyboard as a means of communicating with the computer?

USSR UDC 62-50:519.8

SYNTHESIS OF THE HARDWARE STRUCTURE OF AN AUTOMATED MANAGEMENT SYSTEM FOR TECHNOLOGICAL PROCESSES (ASUTP)

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 66-71 manuscript received 1 Apr 76

ROMANOV, I. V., POPOV, S. N., GURNIKOV, KH. I., PAL'CHIK, K. B., and TOLASOV, G. A., engineers

[Abstract] The problem of synthesizing the hardware structure of an ASUTP can be formulated as making a determination of the inventory of hardware complex elements and of the links between them which will make it possible to realize all functions of the ASUTP with a certain amount of raw data in the real time mode with an optimum ratio between cost and reliability of the system. Increasing reliability, which involves redundancy, leads at the same time to an increase in cost and reduction in losses, which in the end influences the economic efficiency of the ASUTP. At the development stage it is practically impossible to make a reliable estimate of loss in economic efficiency because of unreliable functioning (the cost of failure), for this must be done at the

running test stage. Determination of the inventory and of links between elements must be done by taking into account a group of technical and economic indicators, and this requires a systems approach, which usually assumes formulation of a criterion, raw data, and limitations. Raw data and limitations are utilized at the first stage in selecting the hardware complex, when a determination is made of the minimally necessary configuration of the hardware structure, i.e., without redundancy of elements. When an attempt is made to increase reliability of functioning it becomes necessary to introduce the criterion of optimum redundancy, which is the second stage of synthesis. There are two key criteria for selecting the hardware complex, i.e., maximum economic efficiency and minimum cost with a specific level of reliability. Practical use of these criteria is hampered by the absence of a method of determining the cost of failure and by the presence of a bottom line of reliability for an ASUTP of a specific class. In this paper the criterion for optimum redundancy of the hardware complex is taken as the minimum imputed cost of one hour of failure-free operation. A flowchart is shown for the process of synthesizing the hardware complex of an ASUTP, and the individuals steps are explained in detail. This process is of an iterative nature. It consists of the following steps: (1) analysis of raw data; (2) taking limitations into account; (3) determining the type of computer complex; (4) calculation of the required capacity of the main and auxiliary memry units; (5) calculation of the required amount of machine time available; (6) determinating the list of hardware; (7) making a structural diagram of the hardware complex; (8) selection of the criterion for synthesizing the hardware complex; (9) calculation of the quantity of hardware; (10) calculation of reliability characteristics; (11) calculation of the imputed cost of the hardware complex; (12) checking fulfillment of the selection criterion. If the result of (12) is positive, results are formulated and the process is complete; if negative, step (9) is returned to and the process is repeated from here. Application of this technique is illustrated by an example of synthesizing the hardware structure of an ASUTP used in the production of ascorbic acid at the Belgorodskiy Vitamins Combine. A diagram of this structure is shown and a table of the characteristics of variants of this structure is also given. A formula is given for calculating the system's redundancy factor. Figures 2; table 1; references 4 (Russian).

USSR

UDC 681.323:681.322.5

SOME WAYS OF DEVELOPING THE STRUCTURE OF THE PROCESSORS OF CONTROL DIGITAL COMPUTERS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, 1976 pp 22-26 manuscript received 12 Aug 76

KUKHARCHUK, ANATOLIY GRIGOR'YEVICH, candidate in technical sciences, SKB MMS IK AN USSR [Special Design Bureau for Mathematical Machines and Systems of the Ukrainian SSR Academy of Sciences Institute of Cybernetics], Kiev, NIKITIN, ANDREY IVANOVICH, dr in technical sciences, IK AN USSR [Ukrainian SSR Academy of Sciences Institute of Cybernetics], Kiev, and STRUTINSKIY, LEONTIY ANTONOVICH, engineer, SKB MMS IK AN USSR, Kiev

[Abstract] A description is given of features of the structure of a digital control complex developed at the Ukrainian SSR Academy of Sciences Institute of Cybernetics and designed for use in various real time systems, and primarily in systems requiring high reliability and execution rate. This complex can be used in particular for controlling communications switching systems. This complex has 100 percent redundancy, i.e., each basic module is duplicated, and has the capability of automatic diagnosis. This combination of features is the only possible way to achieve the readiness factor of 0.999 required of digital complexes in a number of highly important control systems, considering the state of the art. The complex consists of two sets of functional modules, each set forming a separate specialized control computer made up of the following basic modules: A central processor; a memory, including a unit for linking with memory units, direct-access memory units, and permanent memory units; and a channel module which includes one multiplex and two selector channels. The channels have a YeS-computer interface, making it possible to hook up standard equipment. Various types of special processors have been provided at the individual functional module level for hooking up special peripheral equipment. The modules work in synchronism and are connected by four systems of buses. If a module transmits an information bit to another module within the special control computer of which these modules are a part, at the same time this bit is transmitted to the corresponding module of the redundant special control computer. The receiving module automatically compares the information bits arriving from both buses, with lack of agreement indicating an error in the control complex's operation. Appropriate diagnostic tests are then run, the module responsible for the error is identified, this module is set into emergency operation, the error is localized within it, and the module's proper functioning is restored. In the meantime the remaining modules continue functioning without redundancy until the improperly functioning module is restored to proper functioning. This system makes high reliability possible for the control complex, although it is expensive in that all equipment must be duplicated. Specific systems based on this general system should take individual requirements into account, with regard to need for complete or partial redundancy and specific mode of operation. The flexibility of this system's structure makes this possible. The hardware used to provide a prgraom interface is described, consisting of a four-stage system for mapping events and a system of ring buffers for setting up the sequence for program branches. The special control computers

have been provided with hardware for processing information bits of various length. The main memory utilizes a modular arrangement for information stored within it, i.e., all information is broken down into individual modules of random length. A description is given of the complex's instruction repertoire and the hardware basis for its rapid execution rate is analyzed. Figures 1; references 7: 6 Russian, 1 Western.

CZECHOSLOVAKIA

MAGNETIC BUBBLE MEMORIES

Prague AUTOMATIZACE in Czech Vol 20 No 7, 1977 pp 194-196

KRECAN, JAROSLAV

[Abstract] Semiconductor memories, either of the bipolar type or those produced by the MOS technique are replacing memories with magnetic cores. The new memories are faster, and may be produced more economically. Their disadvantage is that should the current be lost, the stored information disappears. Electromechanical memories do not lose their stored information. On the other hand they tend to be expensive. The magnetic bubble memories have advantages in comparison with the other two types mentioned. They were developed by Bell Laboratories and are offered now by Western Electric, Texas Instruments, Rockwell International, IBM, Hewlett Packard, and Hitachi and Fujitsu in Japan, and by Plessey and Phillips in Western Europe. The magnetic bubble memory (MBM) resembles a magnetic memory with a rotating recording medium realized in a solid phase. The information is recorded in magnetized domains. Magnetized regions in MBM are created in a thin layer of a magnetic material and have magnetization of an opposite kind in relation to the surface area magnetization. The presence or absence of these magnetized areas (magnetic bubbles) expresses the presence or absence of the bytes of the corresponding information. The basic material for MBM is a crystal of a magnetic substance, or an amorphous magnetic material spluttered on a nonmagnetic support such as glass. The cost of MBM memories is lower than the cost of semiconductor memories. MBM operation requires generation, propagation, detection, and annihilation of magnetic bubbles. Generation of magnetic bubbles results in recording of information; detection is needed for reading, propagation is achieved by permalloy shapes, and annihilation removes the stored information. Some MBMs may be split; one of the new units carries the original information, the other is used for reading of information. Various arrangements of MBMs are used; a frequent one is the minor-major loop. This system contains multiple small loops. The basic unit of an MBM is module containing about 100,000 bytes. Texas Instruments offers a different arrangement with 16 monoliths each containing 16,000 bytes. A special microcomputer is normally used for work with MBMs. MBM will soon be competitive with all other types of memories with capacities between 1,000,000 and 10,000,000 bytes. MBMs are suitable for mass production, have a reliability by two order of magnitude higher than electromagnetic memories, and resist errors better in reading and in recording. Figures 2; table 1; references 3 (Western).

CZECHOSLOVAKIA

FIXED LOGIC OR MICROPROCESSORS ?

Prague AUTOMATIZACE in Czech Vol 20 No 7, 1977 pp 197-198

NOVAK, STANISLAV

[Abstract] Before microprocessors were developed complex logical systems had to be solved by integrated circuits of small or medium integration (SSI, MSI). Integrated circuits of the TTL or the ECL type were combined with more complex circuits to simplify their design with respect to the fixed logic. Even at present there are some applications where these circuits have advantages over microprocessors. Microprocessors are mainly suitable for applications with simple or medium complexity where a certain amount of delays can be tolerated. Fixed logic systems are used when fast operation is needed. In a fixed logic system an addition of 2 8-byte words needs less than 50 n sec, while a microprocessor requires 500 n secs. Fixed logic systems are cheaper for small units; microprocessors are cheaper for large complexes. Fixed logic systems are preferred when the functions are simple, where there are only a few different functions with a small number of inputs and outputs, where the programs are not changed and the duties of the memories are limited. Their principal advantage is fast operation. Microprocessors are used for solutions of complex functions with several of the functions being varied, and when servicing of several inputs and outputs is needed. When modifications of the system are anticipated, and memories of large capacities are needed microprocessors should be used, even though they operate rather slowly. Figures 2; tables 2; reference 1 (Western).

USSR

INDUSTRIAL MODEL OF ANALOG COMPUTER PRODUCED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Faster Than a Computer") 23 Sep 77 p 2

[Text] Kiev. An industrial model of the "KMM-12" integrator has been created at the Institute of Mathematics of the Ukrainian SSR Academy of Sciences. With the aid of this analog computer it is possible to investigate processes whose characteristics change continuously. This sort of thing occurs in the construction of hydroelectric power stations and atomic and chemical reactors as well as in the choice of the optimal variant in the mining of mineral resources. It is not necessary to compile a program in order to perform work, and the number of mathematical operations has been reduced to a minimum. There are a number of tasks which the integrator can solve significantly faster than an electronic computer. Output of the "KMM-12" has been begun at the experimental-pilot plant of the Donetsk Coal Institute.

USSR

UDC 681.3.001.33

CLASSIFICATION OF ELECTRONIC KEYBOARD COMPUTERS AND DISTINCTIVE FEATURES OF THEIR EXTERNAL LANGUAGES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 5, 1977 pp 10-12

BUKHSTAB, A. I., candidate in engineering sciences, FROLOVA, S. V., and FROLOV, YU. V., engineers

[Abstract] Electronic keyboard computers are classified as very simple, business and scientific on the basis of their intended application. Very simple keyboard computers perform the operations of addition, subtraction, multiplication and division and operations with a constant; business keyboard computers perform those operations and in addition have manual and automatic accumulation. Scientific keyboard computers perform the four basic operations, calculate elementary and special functions and metric conversions and perform operations in statistics, topography, astronomy, etc. They can be programmed for frequently encountered tasks and then solve those tasks automatically with programmed control. Programs can be recorded in keyboard computers in keyboard and algorithmic languages. Simplified algorithmic languages based on BASIC, FORTRAN, and others, used in programmable keyboard computers, will be discussed in the conclusion of the article, to be published in a later issue of the journal. Tables 4.

USSR

IT'S BEING DONE WITH CYBERNETICS

Tallin SOVETSKAYA ESTONIYA in Russian 12 May 77 p 2

PETERSEN, I., assistant director for scientific work of the Institute of Cybernetics, Estonian SSR Academy of Sciences

[Text] Basic activity at the Institute of Cybernetics AN ESSR is focused on the study of fundamental problems in cybernetics and adjacent disciplines--on the development of new procedures for creating programs for third-generation electronic computers, on the solution of urgent problems of control theory (in particular the control of continuous, technological processes), and on the development of new methods for studying materials, etc. However, along with these fundamental problems and in the same area with them, work is also being done whose results will have an immediate effect on the national economy.

The development of methods and software for management of technological processes is the most important. Experience shows that with any number of complex, industrial, chemical processes it is possible to heighten the effectiveness of the process by 5-10 percent by using a computer-based management system instead of the usual automatic equipment. This increase in effectiveness is

caused by an improvement in process stability and to carrying it out under more favorable conditions. But interfacing a computer with actual technological processes requires working out of a number of special problems. These are: the mathematical description of the process, control algorithms. basic software for the computer and the development and programming of actual systems.

In solving these problems at the institute, a number of results were reached which were introduced into the carbamide department of the Shale Processing Plant (SPK) imeni V. I. Lenin or given to other institutes for use. So, the system for accomplishing technological and economic calculations and technical recording of the carbamide process--a first line ASUTP (automated system for management of technological process) created in the department--has already been in operation for six months at the SPK imeni V. I. Lenin. This special operational system, in which connections with computers directly manage the processes, has been proved out by experience. Now, on its basis, a second line of the ASUTP is being put into operation in the shop. Our operational system has also been reproduced by a number of area organizations who are engaged in the development of other ASUTP's.

Still another work of the Institute, which has been introduced into several organizations, is the questionnaire system for processing economic data--ASOED. This system, which was developed earlier for the well-known "Minsk" computer series, was converted last year entirely to the YeS-type computer which is widely used in the country. In this connection, the State Committee for Science and Technology of the USSR Council of Ministers, is interested in our system and, on its own initiative, has provided for the organization of a special study center in Moscow for incorporating the system into a number of departments. We hope that this will also make it possible to overcome the skepticism which has been expressed in some computer centers of our republic toward the ASOED system. The Institute, on its own side, is continuing to develop the system and also to work on new variations of it for use in dialogue operations.

Let us also note the work on mathematical modeling of city traffic systems, which is exciting the interest of Tallin residents. The problem here consists in developing a program which would permit the prediction of changes in traffic flow intensity subject to regulation of movement by road signs, the traffic signal system, etc. A program is being developed which is based on the traffic problems of Tallin, but it is sufficiently general in nature that, after we have gained experience with it, it may be easily used for the solution of traffic problems in other cities as well.

Employees of the Cybernetics Institute are keeping track of the problems arising in our national economy by their profile and are doing more all the time for their timely and skillful resolution.

USSR UDC 681.3.06:(62-52+656.13)

SOFTWARE FOR MOTOR VEHICLE AUTOMATIC MANAGEMENT SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3, May/Jun 77 pp 46-50
manuscript received 15 Jul 76

LOZNITSA, AL'FRED STEPANOVICH, engineer, CKB MMS IK AN USSR (Special Design Office. (Expansion Unknown) Cybernetics Institute. Ukrainian SSR Academy of Sciences]

[Abstract] The operational system of the motor vehicle automatic management system is based on general software for the Minsk-32 computer: 56 programs and modules with a volume of more than 26,000 commands. The operational system forms and manages the data base, schedules and controls the computing process in the automatic control system, the receipt of information over the communication channels and its incorporation in the data base. The operational system has two autonomous subsystems, which operate under control of the DISPETCHER program of the Minsk-32 computer: a subsystem for automating data control and a subsystem for control of the computing process. Input into the subsystems is in interrogation language. Figure 1; table 1; references 2 (Russian).

USSR UDC 62-50:007.5

LANGUAGE AND SOFTWARE FOR MAN-DATA BANK DIALOG

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3, May/Jun 77 pp 56-60 manuscript received 4 Jan 77

ZYRYANOVA, TAMARA VLADIMIROVNA, engineer, INEUM [Institute of Electronic Control Machines, USSR Academy of Sciences], Moscow; NAUMOV, BORIS NIKOLAYEVICH, corresponding member, USSR Academy of Sciences, INEUM, (Moscow); PRACHENKO, VIKTOR DMITPIYEVICH, candidate in technical sciences, INEUM (Moscow); and SEMIK, VALENTIN PETPOVICH, candidate in physical and mathematical sciences, INEUM (Moscow)

[Abstract] Shared-time computer systems can be placed in three categories, based on the use of computer memory: systems in which users work with independent files; systems in which users work with common files in the read mode; and systems in which users operate with common files in both the read and write modes. Shared-time systems intended for man-data bank dialog are in the third category. These systems are examined at length. The dialog language is made up of three sublanguages: a language for control of the data transmission network; a dialog language for data manipulation; and a service language for dialog support. Implementation of systems for man-data bank dialog relies on the so-called telecommunication access method--a set of language and software devices intending for servicing terminals and communication channels through which terminals are connected to computers. Figures 2; references 4 (Russian).

USSR

UDC 681.3.06

MODULAR SOFTWARE SYSTEM FOR THE M7000 ASVT-M

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, 1976 pp 93-98
manuscript received 17 May 76

AYZENBERG, ALEKSANDR BORISOVICH, senior scientific associate, NIIUVM [Scientific-Research Institute of Control Computers], Severodonetsk, VINOKUROV, VLADIMIR GENNADIYEVICH, engineer, NIIUVM, Severodonetsk, KOSTELYANSKIY, VLADIMIR MIKHAYLOVICH, candidate in technical sciences, NIIUVM, Severodonetsk, REZANOV, VYACHESLAV VASIL'YEVICH, candidate in technical sciences, NIIUVM, Severodonetsk, SMOLKIN, VALERIY MARKOVICH, senior scientific associate, NIIUVM, Severodonetsk, and SHCHERBAKOV, YEVGENIY VASIL'YEVICH, engineer, NIIUVM, Severodonetsk

[Abstract] A description is given of the modular software system for the M7000 ASVT-M [automated minicomputer system], with emphasis on the main packages of program modules. The main concepts underlying the ASPO [modular software system] for the M7000 ASVT-M are discussed, with emphasis on the higher efficiency gained in comparison with the software for the M6000. The M7000 makes possible not only dynamic, but also static setup of program modules while putting together the operational system. A macroclock was developed for this purpose, and program modules to be set up statically are written in macro language in the form of macro definitions. This macro language is close in syntax and capabilities to the macro assembler language of the IBM/360 and that of the YeS computer. Operational systems are built on the modular principle and it is possible to obtain multidiversified operational systems with various combinations of properties from a single set of program modules by adjusting and rearranging them. This is made possible by a system of program interfaces between user programs and the operational system and between system program modules. Program interface adapters have been developed as part of the ASPO to make it possible to run programs on the M7000 which were written for the M6000. The software for the M7000 makes possible a high degree of adaptability to each specific application, minimization of time spent and space occupied for performing a specific set of functions, continuity with respect to programs developed earlier, and the ability to gradually develop and improve the software system without radically altering it. The ASPO for the M7000 is in the form of two types of program modules: Alterable, that is, adaptable to predetermined parameters, and permanent. Modules of the first type are programmed in macro language and are supplied to users in the form of libraries of macro definitions. Modules of the second type are programmed in ASSEMBLER, FORTRAN, or ALGOL, and are compiled in transferrable binary format. Each variant of this type of module is a separate program or a program included in one of the libraries. Operational systems which can be designed with ASPO modules are discussed (single-problem, single-processor, no-disk systems; multi-problem, double-processor, disk systems; and other combinations), and the functions of the types of modules used for this purpose are described. In addition, a description is given of the following groups of module packages: Packages for setting up specialized program systems; general-purpose libraries; problem-oriented packages of program modules; and the package for the program preparation system. The last system makes use of various translators, a symbolic data editor, a program packager, and debugging programs. References 4: 1 Russian, 3 Western.

CZECHOSLOVAKIA

UDC 681.3.06

PROGRAMMING OF MICROCOMPUTERS

Prague AUTOMATIZACE in Slovak Vol 20 No 7, 1977 pp 185-188

HORA, PETER, Department of Technical Cybernetics Applied to Transportation Systems, College of Transportation, Zilina

[Abstract] The article discusses programming of the INTEL 8080 microprocessor developed at the College of Transportation at Zilina. A typical application program of a microcomputer contains 50 to 4,000 instructions. The means of programming depends on the length of the program, the required speed of calculations, and the time allowed for the development of the program. In the algorithm stage of program preparation, the programmer may select either the language of symbolic addresses or a higher programming language. In the program using the language of symbolic addresses, the structuring of the program is made by the assembler. Such programs consist of the monitor, text editor, resident assembler, main program, tracing program, and sub-programs. Improvement in the productivity of this system depends on improved hardware. When production of a large number of application programs is under consideration a system for development of programs must be prepared. Such systems are usually created by a combination of a microcomputer and a minicomputer. Such a system was developed by the author for the Intel 8080 computer using a HP 9830 computer. This system consists of the language of symbolical addresses and a cross assembler. The language used is the INTEL Assembly Language (IAL). The program assembler is written in the language BASIC HP 9830. Syntax control discovers possible syntax faults in the program. When a syntax mistake is discovered the assembler does not execute the order, but signals the error and asks for a new command from the keyboard of the calculator. A program introduced into a computer in the form of a source remains stored in the external memory and it may be modified by commands from the text-editor inside the casette. For the uniformity of microcomputer programming, translators for host computers were developed; these may use higher programming languages such as the PL/M language. The PL/M translator was originally designed for Intel 8008, but at present it is suitable also for Intel 8080, Motorola 6800, and Zilog 80. The SCELBAL (Scientific Elementary Basic Language) may also be used. Figures 3; table 1; references 13: 3 Czech, 10 Western.

USSR UDC 62-50

GMDH ALGORITHM FOR RECOGNITION OF BLACK-AND-WHITE IMAGES OF LETTERS OR DIGITS

Kiev AVTOMATYKA in Ukrainian No 4, Jul/Aug 77 pp 11-15 manuscript received 5 Oct 76

PAK, V. H., and KYR'YAKOV, YU. M., Rostov State University

[Abstract] An algorithm is suggested for recognition of black-and-white letters or digits, which is invariant to rotation or movement of images in the receptor field. The algorithm is constructed on the self-organization principle and distinguishes one letter (examples are given with letter T) from another regardless of the letter position in the matrix. The suggested algorithm has been implemented on a BESM-4 computer in ALGOL-60. Figures 9; references 2 (Russian).

USSR UDC 681.3.06:681.39

SOME PROBLEMS IN CREATING SYSTEMS SOFTWARE FOR STATE NETWORK OF COMPUTING CENTERS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, 1976 pp 53-59 manuscript received 7 Jun 76

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[Abstract] The GSVTs [State Network of Computer Centers] will unite ASU's [automated management systems] and VTs's [computer centers] into a single State-wide system for gathering, storing, and processing information for solving problems in accounting, planning, and controlling the national economy. Important at the design stage is the creation of systems software for the GSVTs, i.e., the creation of programs which will make it possible for the user to interact with the network as with a single virtual multiprocessor computing system. This paper is devoted to making a preliminary determination of the key specifications for this system from an examination of existing computer networks in the USSR and abroad. The state of the invetory of computer equipment makes it necessary for the system to be diversified, insofar as complete compatibility of equipment does not exist and built-in flexibility will make changes and improvements less difficult. This position is open to some revision in light of growing compatibility between new systems being developed. In choice of topology, a distributed network will better suit the needs of the GSVTs, i.e., all key functions of the network's operational system will be distributed among various network systems, but there will be a number of specialized centers at which data on the current state of the network or all documentation on the network will be concentrated, or at which scientific developments in the network will be coordinated. The GSVTs should have the capability of exchanging information in both the channel switching and message switching modes. The closest analog to the GSVTs in functional and informational traits is the French government's CYCLADES system; the GSVTs should also feature the capabilities of the ARPA system, with respect to its dialog system and ability for several remote computers to work jointly on a single problem. A central information control service will make it possible to concentrate the network's resources on solving urgent problems. The systems software to be developed includes the following: Systems software for computer center control points which will serve remote users in both the dialog and package modes; a distributed network operational system; systems data software for the network, including data bank software; software for programs and algorithms and an automated system for writing programs. A brief description is given of each of these subdivisions. A survey is given of types of problems which will be solved by the GSVTs, such as a

dialog system of planning both within a specific industry and between different industries on the Gosplan level. The sequence of steps to be taken in creating the GSVTs is detailed. Most important in this regard is the sequence to be followed in developing the network's distributed operational system, without which exchange between computers is impossible. This sequence includes development of remote access methods and methods of priority exchange, and of software for the data transmission system. References 5 (Russian).

USSR

UDC 681.3:658.8.03

INFLUENCE OF THE AUTOMATED SYSTEM FOR PROCESSING PRICING DATA ON AN INCREASE OF THE QUALITY AND EFFECTIVENESS OF CONTROLLING PRICING

Kiev MEKHANIZATSIYA I AVTOMATIZATSIY UPRAVLENIYA in Russian No 6, 1976 pp 18-20 manuscript received 17 May 76

KALITA, N. S., dr in economic sciences, and GROMOVOY, V. A., candidate in economic sciences

[Abstract] The automated system for processing data on pricing (ASOI on Pricing) is the Ukrainian SSR's component of the Statewide system for processing data on pricing of the country's Committee on Pricing and is at the same time a functional component of the republic's automated system for gathering and processing data for accounting, planning, and managing the national economy of the Ukrainian SSR (the RAS USSR). The job of the ASOI on Pricing is to provide for practical, high-quality processing of economic data for carrying out a pricing policy and for making an in-depth economic analysis of the production conditions and production output conducive to further improvement of the task of setting wholesale and retail prices and rates for services, and of planning, forecasting and coordinating prices and of acting as a watchdog over government pricing rules, as well as of mechanizing and increasing the efficiency of labor-intensive operations involved in setting prices and drawing up price lists on the part of pricing agencies. Phase one of the ASOI on Pricing is now in operation and the pricing problems it solves cover the key functions of the job of the republic's Committee on Pricing. The specific types of problems solved by phase one are detailed in this paper, with emphasis on the underlying rationale for concentrating on these problems at this stage. Development of the system required a review of pricing methods. Drawing up price lists is a highly labor-intensive process owing to the many factors which must be taken into account and the ever changing criteria for pricing. Phase one includes problems of setting retail and wholesale prices for products of light industry, many of which require frequen price review. In the process of developing the system standards were developed for materials and labor costs, overhead and non-production expenses, and profitability, formulas were derived for pairing up pricing standards and product parameters, and algorithms and computer programs were developed. The problem of making an automated analysis of current wholesale prices for different types of machine-building products was solved. Problems of price planning and forecasting were included in phase one. The data obtained in the process of developing phase one is of far-ranging importance for further development of the system. An automated price list data bank and a data search system were created. It is planned for the future to increase the efficiency of the system by making possible its interaction with pricing subsystems of the Statewide Automated Management System (OASU) and other subsystems of the RAS USSR. Phase two will require solutions to the complex problems of compatibility of the ASOI on Pricing with the OASU, ASPR [automated system of plan calculations], and other local and Statewide automated systems from the standpoint of procedures, the data base, hardware, and software. State-of-the-art hardware will be a particular problem. Problems in this area were encountered in phase one, with a lack in addition of a sufficient number of development personnel.

USSR UDC 681.3:338.984

GUIDELINES FOR AND MEANS OF INCREASING THE EFFICIENCY OF THE UKRAINIAN SSR GOSPLAN'S AUTOMATED SYSTEM OF PLAN CALCULATIONS IN THE 10TH FIVE-YEAR PLAN

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 12-18 manuscript received 5 Jul 76

KIRILYUK, N. I., and RUBAN, V. YA., candidates in technical sciences, and KAMENETSKIY, S. M., candidate in economic sciences

[Abstract] The ASPR [automated system of plan calculations] of the Ukrainian SSR Gosplan is eventually to be incorporated into the Statewide system for gathering and processing data. It is necessary therefore to find ways of increasing the efficiency of the system already created. This paper suggests ways in which this can be done in the 10th Five-Year Plan. Three main aspects of the problem are treated here: The substantive economic aspect or functional aspect, involving improving methods and techniques of national economic planning for the republic on the basis of extensive use of cybernetic methods; the development of facilities making realization of these methods possible; and developing of planning methods and systems for the ASPR. The first phase of the Gosplan's ASPR was put into operation in 1976. This paper begins by analyzing the structure of the first phase and finding trouble spots in it, after which effective guidelines for further development of the system are recommended. There is the most room for improvement in solving optimization, balancing, and forecasting problems, which are used for purposes of analysis and as the basis of variants of planning decisions. One major problem is that of gathering and analyzing reliable initial data which makes it possible to use the financial balance between individual industries as an effective tool for drawing up a national economic plan for the republic. The GlavNIIVTs [Main Scientific Research Institute of Computing Centers] of the Ukrainian SSR's Gosplan regularly makes analytical calculations in order to determine the degree of proportion and balance in the national economy on the basis of a model of the dynamic balance between industries. The major trouble spot in the first phase of the ASPR is the fact that not enough of the planning process on the part of the Gosplan has been computerized and that there is insufficient unification of problems solved by various subdivisions of the Gosplan, into a coheerent computer-assisted planning system. The second phase of the ASPR, to be initiated in the 10th Five-Year Plan, will concentrate on creating a unified system. A chart is shown which indicates stages in the step-by-step development of plans for the development of the national economy of the Ukrainian SSR to be included in the second phase. Attention will be paid to development of a hierarchical ASPR structure, to include the ASPR of the USSR's Gosplan, those of individual republics, and those of individual oblasts and cities. A unified system of planning documentation followed by creation of an automated data bank will make possible interaction between ASU's [automated management systems] and the ASPR. The number of problems solved will increase by a factor of three to three and one half, as compared with the Ninth Five-Year Plan. The first phase of the ASPR utilizes "Ural-14" and YeS-1020 computers; phase two can be implemented effectively by replacing these with a YeS-1040, YeS-1022, and YeS-1033. Twenty new data arrays and

about 50 new general-system dictionaries will be created. Standard packages of applied programs will be introduced to solve problems of optimal planning, forecasting, and extrapolation, for statistical data processing, for creating models of economic dynamics, for analyzing breakdowns among industries, and for making direct planning calculations. Planning methods will be standardized by identification of the common features of problems handled by different subsystems. Figure 1; table 1.

USSR UDC 658.5.011.56:658.562

PROBLEMS OF AUTOMATED QUALITY CONTROL IN AN AUTOMATED ENTERPRISE MANAGEMENT SYSTEM

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 46-50 manuscript received 21 May 76

CHERKASHIN, O. F., candidate in technical sciences, and IVANENKO, I. B., engineer

[Abstract] The "Elektron" Production Association in conjunction with the Ukrainian SSR Institute of Cybernetics has developed and introduced an ASUP [automated enterprise management system] which has become a model for a systems approach to the problem of quality control. The first phase of its KSUKP [combined system for production quality control] was put into operation in 1975. This system is the result of a hybrid approach to development and introduction of the system. It represents a blend of two points of view on the structure of a KASUKP [combined automated system for production quality control]: That of a concentrated subsystem, whereby the entire set of automated quality control problems is combined into a single subsystem of the ASUP; and that of a distributed set of problems, whereby the set of automated quality control problems is not united into a subsystem, but is spread out among traditional subsystems of the ASUP. The problem with the first approach is determining the set of elements of the KASUKP, because all subsystems and problems of the ASUP influence quality, and the second viewpoint leads to serious difficulty in practical implementation with the traditional selection of ASUP subsystems. In the hybrid system developed, traditional ASUP subsystems have been reoriented for more efficient solution of quality control problems and an independent ASUP subsystem, "Product Quality," has been created, utilizing the principles underlying a KSUKP and tying it in with the other subsystems of the ASUP. The new subsystem is based on a simple engineering model with a three-dimensional structure, with product quality factors along the X axis, elements of the quality control circuit along the Y axis, and five levels of control along the Z axis. A diagram of this subsystem is shown. The key organizing element of this system is a so-called machine-oriented enterprise standard for the KASUKP, which is based on the State system of standardization. The three upper levels of the system's structure are uniform and obligatory for all enterprises (Level I--"Quality Control" subsystem; Level II--planning, production, utilization; Level III--

electrical circuits, design, etc.), whereas the lower two levels of control are either recommended or can be tailored to the individual enterprise (Level IV--Machine design of electrical circuits, reliability, labor, etc.; Level V--Component quality, design of linear circuits, etc.). The stages in introducing the KASUKP are listed, for introduction must be gradual according to the principles underlying KSUKP's which are discussed here. Subsystems introduced at the second stage, such as "Control of Work Quality," are oriented toward multilevel computer complexes, such as the "Elektronika-100" and YeS-1010 minicomputers on the branch plant and shop level, and YeS-1020 and YeS-1022 computers on the main plant and Association level. All KASUKP problems are original and do not have analogs either at home or abroad. Special hardware has been created especially for the "Elektron" Association in L'vov, which makes television sets. Full-scale introduction is scheduled for 1976-1980. Figure 1; references 4 (Russian).

USSR

REVIEW OF COMPUTER CENTERS

Tashkent EKONOMIKA I ZHIZN' in Russian No 6, Jun 77 p 80

[Text] The Uzbek Republic Interdepartmental Council on Problems of Improving Management Control in the National Economy, the Uzbek Republic Council of Scientific-Technical Societies, and the Commission for Automated Management Systems under the Council for the Promotion of Scientific-Technical Progress, Central Committee of the Uzbekistan Communist Party have declared that a public review of the operation of the republic's computer centers will be held from 1 April 1977 to 1 April 1978.

The conditions of the review and the make-up of the republic review commission have been approved. The commission is headed by A. K. Irgashev, first deputy chairman of Gosplan Uzbek SSR.

Intermediate results will be supplied in time for the 60th anniversary of Great October.

USSR UDC 622.323 65.85

AUTOMATION OF ECONOMIC PLANNING CALCULATIONS--THE MOST IMPORTANT DIRECTION IN THE AUTOMATED MANAGEMENT SYSTEM--PETROLEUM

Moscow EKNOOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No 5, 1977 pp 10-12

RYNSKIY, O. M., Ministry of Petroleum Industry

[Abstract] The automated management system (AMS) of the petroleum industry is based on the network of multiple-user information and computing centers of the petroleum extracting associations and administrations of petroleum pipelines, which are the time-sharing computer centers of a petroleum region. The main information and computer center combines all the computer centers of the AMS of the petroleum industry into a unified system. The remaining computer centers function in geophysical organizations (18 centers) and institutes (20 centers) where they provide electronic processing of seismic data and solve problems in the optimum working of petroleum deposits and the designing of their structures. The complex automation of production and the creation of the AMS required the laying of over 15,000 kilometers of cable communication lines and the creation of 53 computer centers equipped with electronic computers with a total capacity of over 6 million operations a second. The saving resulting from the introduction of automation and AMS is 10 million rubles a year for the branch as a whole. In addition, economists and engineers must obtain the possibility of direct access to electronic computers for direct participation in the calculation and analysis of the technical and economic indices of the plan. For that purpose equipment for the remote processing of data which third-generation electronic computers make available will be used.

USSR UDC 658.5.011.56

RAISING EFFICIENCY AND QUALITY IN DEVELOPING AN AUTOMATED ENTERPRISE MANAGEMENT SYSTEM (USING AS AN EXAMPLE THE AUTOMATED MANAGEMENT SYSTEM FOR THE KIEV 'KRASNYY EKSKAVATOR' PLANT)

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 41-46 manuscript received 26 Apr 76

RUBAN, V. YA., candidate in technical sciences and SHOSTAK, G. F., engineer

[Abstract] ASUP's [automated enterprise management system] can be developed efficiently with a high-quality result if special methods of arriving at solutions are used which will result in the maximum possible quality rating for the ASUP. The quality indicator adopted in recent years is the NTU [scientific and technical level], which characterizes the degree of systematization of production and labor, the savings potential of the system, the degree to which management problems are automated, and the systems engineering level of the ASUP represented by the finished product. The systems engineering level of the ASUP is determined by a hierarchical system of particular indicators characterizing the level of the ASUP's systematization, hardware, and software and covering sections and processes of the ASUP whose quality is determined by several factors in turn. It is thus a complicated and almost impossible affair to use previously suggested methods for arriving at solutions in developing an ASUP, because of the vast number of possible variants and the complexity of factors affecting the systems engineering level alone. The table shown here gives summarized data relating to problems of improving the systems engineering level of an ASU [automated management system]. This paper describes a systematic method of arriving at solutions to these problems in developing an ASUP.

Наименование (1)	Обозначение (2)	(3) Исходные данные			(4) Расчетные величины		
		Максимальное значение показателя НТУ ($У_н$) (5)	Коэффициент важности видов обеспечения (α) (6)	Коэффициент важности факторов (γ) (7)	Достигнутое значение показателя НТУ ($У_д$) (8)	Значение проблемы ($\Delta У$) (9)	Вес проблемы (v) (10)
(11) **Организационное обеспечение**	$У_1$	10	0,5		5,11	4,89	2,45
(12) 1.1. Подготовка исходных данных:	$У_{11}$			0,3			
(13) индивидуальная		6					
(14) комбинированная		8					
(15) централизованная		10			10	0	0
(16) 1.2. Использование данных:	$У_{12}$			0,4			
(17) с регламентацией использования документа		5			5	5	2,0
(18) с регламентацией использования показателя		10					
(19) 1.3. Устойчивость к нарушениям:	$У_{13}$			0,2			
(20) с нарушением		5					
без нарушения в результате резервирования функций (21) персоналом		8					
без нарушения в результате резервирования средств (22) автоматизации		10			10	0	0
(23) 1.4. Доля оптимизационных задач в общем числе задач:	$У_{14}$			0,1			
(24) до 5%		3			3	7	0,7
(25) 5—20%		8					
(26) свыше 20%		10					
(27) **2. Техническое обеспечение**	$У_2$	10	0,2		4,2	5,8	1,16
(28) 2.1. Степень использования ИВЦ:	$У_{21}$			0,5			
(29) до 8 ч		3					
(30) » 14 ч		5					
(31) » 18 ч		8			8	2	1,0
(32) свыше 18 ч		10					
(33) 2.2. Связь ИВЦ с периферией:	$У_{22}$			0,3			
(34) неавтоматическая		2			2	8	2,4
(35) полуавтоматическая		6					
(36) автоматическая		10					
(37) 2.3. Средства отображения при возникновении отказа	$У_{23}$	3		0,2			
(38) регламентные		7			7	3	0,6
(39) ответно-запросные		10					
(40) **3. Математическое обеспечение:**	$У_3$	9,4	0,3		3,08	6,32	1,9
(41) 3.1. Тип ЭВМ	$У_{31}$			0,3			
(42) «Минск-22»		3					
(43) «Минск-32»		5			5	3	0,9
(44) ЕС ЭВМ		8					
(45) 3.2. Информационное обеспечение:	$У_{32}$			0,5			
(46) локальное решение задач		3					
(47) с единым нормативным хозяйством		5			5	5	2,5
(48) с единой информационной базой		10					
(49) 3.3. Средства программирования:	$У_{33}$			0,2			
(50) машинные команды		2			2	8	1,6
(51) алгоязыки		5					
(52) операционные системы		10					

[Key on following page]

Key:

1. Item
2. Symbol
3. Raw data
4. Calculated values
5. Maximum value of NTU index
6. Importance factor for types of main category
7. Importance factor for individual factors
8. Value of NTU index reached
9. Value of problem
10. Weight of problem
11. Systematization
12. Preparation of raw data
13. Individual
14. Combined
15. Centralized
16. Utilization of data
17. With regulation of document utilization
18. With regulation of indicator utilization
19. Resistance to violations
20. With violation
21. Without violation as the result of redundancy of functions on the part of personnel
22. Without violation as the result of redundancy on the part of automation hardware
23. Proportion of optimization problems of total number
24. Up to five percent
25. Five to 20 percent
26. More than 20 percent
27. Hardware
28. Degree of utilization of IVTs [computing and information center]
29. Up to eight hours
30. Up to 14 hours
31. Up to 18 hours
32. More than 18 hours
33. Link between IVTs and peripherals
34. Non-automatic
35. Semiautomatic
36. Automatic
37. Means of indication in case of failure
38. Routine
39. Question-response
40. Software
41. Type of computer
42. "Minsk-22"
43. "Minsk-32"
44. YeS series
45. Data handling
46. Local solution of problems
47. Single referencing
48. Single data base
49. Programming facilities
50. Machine instructions
51. Algorithmic languages
52. Operational systems

The method suggested is based on the problem-oriented approach suggested in earlier papers and follows a sequence of formalized procedures. The desirable value of the quality rating for the system and its component parts, i.e., the integral NTU index, is formulated first. Next the difference is found between the desirable and actual state of the system under study. Particular problems are then weighted according to their influence on the overall problem of developing the ASUP. Problems are then ranked by weight. Solutions to these problems are then found. Solution variants are identified and tested for their effect on the NTU index. It is also taken into account that the problems have subproblems which must also be ranked according to a quantitative evaluation of quality and weighting coefficients expressing the significance of various factors. The best variant is selected and tested through. This method is used to increase all components of the integral NTU index. An

example of applying this method is given. It is concluded that this method makes it possible to formalize the selection of and systematize the search for solutions for developing and raising the efficiency of ASU's by making a quantitative evaluation of development problems, selecting permissible solutions, and taking into account the cause and effect relationships between solutions which can be used. Table 1; references 3 (Russian).

USSR UDC 622.7:681.3

EXPERIENCE OF DEVELOPING AND INTRODUCING AN AUTOMATED MANAGEMENT SYSTEM AT THE INGULETSKIY ORE-DRESSING COMBINE

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 50-54 manuscript received 3 Jun 76

PLEMYASHOV, A. S., KAGRAMANYAN, E. A., POPKO, I. A., and SHTEFAN, A. I., engineers, SHUPOV, L. P., candidate in technical sciences, and TEREKHOV, L. V., and RAKITINA, L. YA., engineers

[Abstract] The first ASUP [automated enterprise management systems] in the USSR's ore-mining industry was introduced at the Inguletskiy Ore-Dressing Combine (InGOK) imeni the 50th Anniversary of the USSR. The first phase was put into operation in 1970, with a resulting annual savings of 404,800 rubles, and the second phase in 1975, with a resulting annual savings of 455,300 rubles. The payoff period for the system is 2.5 years. The Inguletskiy Ore-Dressing Combine is one of the largest iron-ore enterprises in the country, including 20 shops and about 3,000 units of equipment. The entire process performed here is highly complicated, utilizing highly diversified equipment and processes with complicated interrelationships. The purpose of control is to fulfill plan quotas for concentrate output and to maintain stable parameters relating to the quality of ore and of the products obtained from concentrating it. This ASUP includes seven subsystems: "Technical-Economic Planning and Production-Process Preparation," "Operational Management of Key Production Processes," "Management of Ancillary Production," "Bookkeeping and Statistical Reporting," "Personnel Management," "Control of Supplies of Materials and Equipment," and "Marketing and Financing Management." A structural diagram is presented, showing the relationship between functional subsystems and the problems solved by the ASUP. The hardware employed is based on three "Minsk-22" computers and peripheral gear for automated exchange of data between the computing and information center and controlled systems. Most of the problems solved by the system are traditional for an ASUP, but the system also solves a number of problems specific to ore-dressing combines, such as a number of problems in planning an optimum ore charge, and problems in controlling processing sections of a concentration plant in the "adviser" mode. The way in which the problem of planning an optimum ore charge is formulated is described in detail. The result of this process has been an increase in the average hourly output of a concentration plant section of

1.335 tons per hour, in tons of unconcentrated ore, giving an annual savings of 240,000 rubles. Methods of predicting random sequences are used to solve the problem of operational management of concentration plant sections in the "adviser" mode, and a description of applying these methods is given. A table shows the key technical-economic indicators for the InGOK's ASUP. The know-how gained from developing and introducing this system has been used to solve problems of automating management at other ore-dressing enterprises in the country. Figure 1; table 1.

USSR UDC 681.323

CREATION OF A COMPUTER NETWORK FOR FERROUS METALLURGY IN THE UKRAINIAN SSR

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, 1976 pp 59-62 manuscript received 5 May 75, after completion 27 Apr 76

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[Abstract] Twenty-two computer centers have already been created for the Ukrainian SSR's ferrous metallurgy industry and the first and second phases of ASUP's [automated enterprise management systems] have been put into operation at a number of the largest enterprises. The development of new highly efficient methods of planning and control is making necessary improvement of hardware. This paper takes a look at the wide-scope approach toward optimizing the hardware system, i.e., at creating a computer network for the entire ferrous metallurgy industry in the Ukraine. A systems analysis is made of variants of hardware system structures designed to process data resources of the industry and an evaluation is made of these structures from the viewpoint of cost effectiveness. Data resources are defined here as various sorts of technical-economic indicators, norms, recurrent phenomena, limiting factors, and other data which are analyzed in solving problems of planning and control at all levels. Results of the analysis are plotted on a curve showing the cost of five possible variants, including the creation of 10, 7, 3, and 2 multiple-user computer centers, and the use of total centralization. The implementation of three multiple-user computer centers will provide the greatest efficiency at lowest cost. They will be created primarily in large industrial centers in which the key enterprises of the industry are concentrated and will be provided with an advanced system of communication both with other areas in the region and with the central control agency. The three centers will be created in Dnepropetrovsk, utilizing the Main Data Processing Center of Minchermet USSR, Krivoy Rog, and Donetsk. A chart is given, showing the relationships between these centers and between the various production associations and enterprises of Minchermet USSR. The largest industrial associations and enterprises of the industry are concentrated in Krivoy Rog,

with data resources of 30 million characters per 24-hour period. Computer centers have been created at the Krivoy Rog Metallurgical Plant imeni V. I. Lenin and at the Inguletskiy Ore Concentration Combine. Preparations are being made to introduce ASU's [automated management systems] at a number of the largest mining enterprises. The ASU at Krivoy Rog must have the capacity of processing 18,500 data characters per 24-hour period, representing 74 percent of the total data of the mining industry of Minchermet USSR. Introduction of the multiple-user system will represent a savings of 70 million rubles over the introduction of computer centers at each enterprise of Minchermet USSR in the Krivoy Rog industrial region and will require approximately 1,000 less people. Implementation of a multiple-user computer center at Donetsk will make it possible to improve control over the heavy flow of iron ore between the Krivoy Rog area and the Don Basin, will make possible smooth delivery of raw material to ore-processing enterprises and metallurgical plants, and will reduce the idle time of processing equipment, rail cars, and locomotives. Figures 2; references 8 (Russian).

USSR UDC 681.2.002.612

ASSURANCE OF A HIGH TECHNICAL LEVEL OF DEVELOPMENT AND INCREASED PRODUCT QUALITY IN INSTRUMENT BUILDING

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 6, 1977 pp 3-4

SHKABARDNYA, M. S., chief, Scientific and Technical Administration of the Ministry for Instrument Building, candidate in technical sciences and
ZIMOKHA, V. A., deputy chief

[Abstract] The experience of the past has shown that successful solution of the combined problem of increasing product quality while assuring high technical levels of products can be solved only by the use of a clearly stated system for the formation of the combined programs of development of the main groups of instruments, automation equipment and computer devices, utilizing modern methods for accomplishment of these programs. Generalized indicators are presented for evaluation of the effectiveness of operation of scientific research institutes and design bureaus and factories in the industry. A branch automated system for storage and retrieval of scientific and technical information, the "Referat" system, has been developed and put on stream. The system now has some 250 subscribers and each year answers more than 6,000 information requests, delivering some 300,000 documents in response to these requests. Further expansion of the system is planned, including the development of a subsystem for preplan estimation of the technical level of products in the industry, allowing automation of the basic processes of comparative analysis and output of recommendations for the development of technical assignments for new products. Serious attention is given to patent, licensing and invention work in the branch. Work is being performed on the investigation and development of new physical principles for the production and conversion of information, new materials and technological processes, the

use of machine methods of planning in combination with improvement of the ergonomic and esthetic qualities of the products produced by the industry. Attempts are being made to shorten the time between research and production of new products, utilizing the standard system for technological preparation of production (ESTPP). A number of factors are important in this area, including the scientific level of specialists, the level of systems engineering research in the area of construction of efficient parametric series used to standardize functional groups of devices into modular series, the degree of utilization of machine methods of planning and the capacity of production preparation services. In addition to improvement of the branch automated management system, the next big step in the business of increasing the technical level of products will be the introduction of the combined system for production quality control (KSUKP), currently under development. The bases for the creation of the branch KSUKP are: conversion of scientific research institutes and design bureaus to the new conditions of planning and economic stimulus; introduction of methods of thorough planning of new equipment, which encompasses all stages of work from research to production; development and introduction of methods of integrated estimation of technical level and quality indicators; development and introduction of methods for objective evaluation of the level of technology of production and its planning; and introduction of a production quality control system at every enterprise. All of these measures are expected to assure that by 1980, 40 percent of the products of the branch will carry the state seal of quality.

USSR

PRODUCTION QUALITY CONTROL IN THE AREA OF INSTRUMENT BUILDING--FURTHER INTRODUCTION AND IMPROVEMENT OF THE COMBINED SYSTEM FOR PRODUCTION QUALITY CONTROL [KSUKP] IN BRANCHES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 6, 1977 pp 1-2

BAZILEVSKIY, YU. YA., Deputy Minister of Instrument Building, Automation Equipment and Control Systems, USSR

[Abstract] Following the lead of the enterprises of L'vov Oblast, which developed and introduced the combined system of production quality control (KSUKP), many enterprises and organizations in this branch of industry have expanded and improved upon this system. An All-Union Seminar of party workers, administrators and industrial specialists was held in June of 1976 in L'vov, dedicated to production quality control, emphasizing the characteristic features of KSUKP, which consists in selection of the main trends for organization and political activity to fulfill the decisions of the party in the area of product quality; close interrelationships among technical, economic, social and organizational measures; a systems approach to the solution of the problem of increasing product quality; effective application of standards at enterprises, allowing increases in product quality to be planned: introduction

of a labor quality factor allowing objective evaluation of the work of individual workers and of teams of workers; extensive utilization of engineering and technical personnel in quality control, giving them a sense of pride and responsibility for the honor of the factory. The system is to encompass all stages of development, production and use of products, and must be broadly scientifically supported and extend through the levels of manufacture, use and maintenance of technical product. The KSUKP system is to be improved in order to increase its effectiveness, assure that the branch KSUKP system is compatible with the systems of enterprises and organizations as to the basic file of norms and information used, as well as more comprehensive utilization of the ASU-pribor [automated management system--instruments] of the branch. The integrated branch system is to be improved by tying it into the statewide automated quality management system.

USSR

UDC 658.5.011.56:621.311.22

THE INTEGRATED AUTOMATED MANAGEMENT SYSTEM OF THE BURSHTYN GRES (State Regional Electric Power Plant)

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 60-66 manuscript received 16 Jun 76

SOROKIN, V. B., engineer

[Abstract] The Institute of Automatic Devices in Kiev has developed an IASU [integrated automated management system] for the Burshtyn GRES, one of the country's large heating and power plants. A feature of a power plant as a managed system is instability in the structure of its elements, a structure which can vary under the influence of both planned and random factors, such as variation in loading schedule and equipment overhauling in the first instance, and accidents, variation in fuel quality, change in atmospheric conditions in the other. As a result the management system must solve a great number of problems of different types. The IASU for the Burshtyn GRES has a two-level structure, because it performs the function of managing process performed both by individual plants (nonstationary modes of power units) and by the power plant as a whole (choice of optimum structure of active equipment, distribution of total load among units, optimization of the GRES's circulation system, and the like). The lower level automatically controls the boiler and turbine. Automatic devices for the boiler and turbine are not linked with the upper level of the system and are actuated when necessary by the watchmen of individual plants. The upper level includes a subsystem for gathering, preprocessing, and transmitting data, and a subsystem for calculating, recording, and analyzing technical-economic indicators. A block diagram of the hardware complex is shown, reflecting this two-level structure. Also included in the upper level are a subsystem for supervisory control of operation and a subsystem for production-economics management. The first selects the combination of key and ancillary equipment to be used and distributes the total load, and the like, whereas the second solves such problems as determining the optimum means of preventive maintenance for equipment. Examples of how these subsystems function are given. This system utilizes "Dnepr-21" and M-6000 computers, and in the normal mode of operation the M-6000 performs the functions of gathering, preprocessing, and storing data, for which it is supplied with peripheral disk and drum stores; the "Dnepr-21" performs the task of solving computing problems. If the M-6000 fails the "Dnepr-21" performs its functions. If the "Dnepr-21" goes out of order (in an emergency or for overhauling) the M-6000 operates in the data storage mode and calculates technical-economic indicators. ASVT-D equipment is used for peripheral gear. A diagram of data links is shown. The annual savings from introducing this IASU has been about 700,000 rubles, and the payoff period is about 2.5 years. This automated management system was assigned to be put into operation in 1975. Figures 2; references 4 (Russian).

USSR

ENTHUSIASTS WORK HERE

Moscow AVTOMATIKA, TELEMEKHANIKA I SVYAZ' in Russian No 6, Jun 77 pp 18-20

ZHIRNOVA, N.

[Extract] Effective utilization of the cargo-carrying capacity of railroads, determination and elminiation of bottlenecks, daily testing of the operation of rolling stock are all impossible without exhaustive information, proper evaluation of the mass of operational information, and timely production of optimum decisions. These requirements can only be met by electronic computers, capable of memorizing practically infinite quantities of facts and information and selecting the optimal solutions from all those which are possible. On the Belorussian Railroad, computer technology is now being used to perform more than 50 tasks which support the transportation process and yield an annual savings of hundreds of thousands of rubles. Twelve times per day, data are sent from the computer center of the railroad to all departments concerning the approach of cars for loading, and each 4 hours data are transmitted to all departments concerning the fulfillment of the operational plan of the railroad. The summary portion of the lists of goods transported is constantly under development for almost all of the trains formed. Thus, the railroad has a well-ordered system for collection and processing of information. The main purpose of the system is to create a model of the railroad in computer memory. One peculiarity of the system is that the total goods list, the "passport" of a train, is stored in computer memory and can be output at any time as needed. Subscribers to the computer information system operate in the dialogue mode with the computer and receive answers from the machine in 6 to 8 seconds. An error correction system is used, in which the computer indicates the nature of the error in any message and its position in the message. The computer can detect and classify over 40 types of structural and logic errors. Information is also transmitted to third parties as required. The data collection network consists of telegraph apparatus or data transmission apparatus, telegraph and telephone communications channels and interface devices. The switching system for the "Minsk-1560" interface device allows tremendous quantities of information to be taken from the transmission line. The computer center includes several Minsk-32 computers, each connected through an interface device to a common magnetic disc storage section. All machines also have access to magnetic drum storage devices. The most important problem facing the railroad is that of increasing the reliability of the Minsk-32 computer, reducing down time for maintenance and increasing the machine time available for training. A system is being developed to allow introduction of the YeS-1022 computer, which will also utilize the common magnetic disc memory system. Data preparation is being improved by replacing punch tape with magnetic tape and converting to improved, more reliable hardware. Forty-nine women and 1 man are employed in the department responsible for publication of the results of computation, providing information to all subscribers of the computer center. Programs have been written for such jobs as make-up of trains and generation of reports concerning the condition and location of rolling stock. The computer center is in its 7th year of operation. In honor of the 60th Anniversary of the Revolution, the

personnel of the center have decided to put their YeS-1022 computer on stream by 7 November 1977, install remote printer devices at all remote and switching stations and organize output of decisions made by the computer at these remote stations, and to develop and introduce a new and improved system for switching of telephone channels. Figures 6.

USSR UDC 658.012.011.56:656.13.07

AUTOMATED SYSTEM FOR CENTRAL CONTROL OF A MOTOR VEHICLE TRANSPORTATION ASSOCIATION

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 55-57 manuscript received 18 May 76

LIGUM, YU. S., candidate in technical sciences, and SOTNIKOV, V. YE., engineer

[Text] A discussion is given of a system for central control of a motor vehicle transportation association introduced at the Motor Vehicle Transportation Association (ATO) 09663 of the Kiev Production Administration for Motor Vehicle Freight Transportation. This system makes possible control of production processes of a motor vehicle transportation association on a real time scale and is based on the use of equipment from a standard-unit hardware system (an ASVT-M)--the M-6000--and of a package of hardware for local management information systems.

USSR

COMPUTER TALKS ON A TELEPHONE

Moscow IZVESTIYA in Russian 16 Oct 77 p 4

TSIKORA, S., Izvestiya Special Correspondent, Kiev

[Text] If you think that scientific and technical progress has dulled your capacity for wonder, I suggest you test this ability again the next time you are in Kiev. Here is how to do it. From any telephone, dial the number 083.

When you hear the dial tone, you may dial, for example, the number of the telephone from which you are speaking. That will be another six turns of the dial. For a second the receiver will be silent. Then you will hear:

"Subscriber (your number will be given) is charged 1 ruble 93 kopecks for two intercity calls in September."

If no calls have been made to another city from this number, you will be told that there are no charges. All this is spoken in a voice that carries the conviction that what is said is reliable. But all the same there is something about the unseen speaker's answer that puts one on guard. First of all, probably, it is the speaker's unusual articulation. It is as if on the other end of the line there were a foreigner trying as hard as he could to speak absolutely correctly. Naturally, that would be hard to believe, and persistent callers try to find out who it was who was speaking to them.

Now comes the moment when our capacity for wonder is tested. It turns out that you were speaking not with another human being, nor even with a robot having a tape recorder with a store of recorded words. The information was given by a computer equipped with a device that imitates the apparatus of human speech. The device does not repeat words previously recorded on magnetic tape, but synthesizes them anew each time in its electronic speech unit, forming words and sentences according to all the rules of grammar and logic.

Surprises using electronics are expensive, and are therefore not suitable for creating a passing effect. If a city turns to the aid of such complex equipment, there must be good reasons.

"The rapid growth of city telephone networks has led to a huge increase in the number of intercity calls," explained to me V. Tikhanov, deputy head of the Republic Data Processing Center of the Ministry of Communications of the Ukrainian SSR. "After all, there's nothing simpler now than calling another city in this country using automatic intercity communications. This undoubted boon to subscribers has become a real headache for communications people. Keeping account of the use of automatic intercity communications has greatly complicated the work of data processing centers and has created chaos in the accounts for individual calls. What is the reason? Put simply, it is the fact that while we automated the system for keeping track of the calls, distribution of receipts and control of payments remained manual operations."

From the outside this is how it appears. You have spoken with a subscriber in another city, and a computer has recorded in its memory the amount you owe to "Intercity." The computer accumulates the information and issues a bill. But here the cybernetics ends and the manual work begins. A person must make sure that the address and phone number of the subscriber have not changed and that the machine has printed the numbers clearly, and must stamp the notification and send the document to the post office. Packets of bills go to postal departments each month. Upon receiving the notification, the subscriber must go to an office to pay the bill, and the office must put its stamp on the receipt and send it once more to the computer center.

Anything can happen to the bill on this long trip. It can even be lost with no one held responsible: the notification is not sent by registered mail, so it is not signed for on delivery. As a result, the communications people receive too many complaints--justified complaints.

Specialists have been looking for a solution. They began by seriously considering the idea of installing individual counters, but that turned out to be too difficult. They then turned to another more attractive version--to set up the same relation between the subscriber and the computer center as that on which the principles employed in accounting for electrical energy use are based. In other words, the subscriber would take upon himself the concern and responsibility for keeping accurate and timely account of intercity telephone calls.

"Putting this idea into operation depended on only one condition," continued Tikhanov. "It was necessary to make it possible for each subscriber to be able to obtain information from the telephone exchange at any time on the status of his accounts for intercity calls. Such information is now stored in computer memory. It turned out that the communications people had to provide each subscriber with access to the computer, which would inform him verbally of his charges. And such a system was created. Now in Kiev there are already several thousand telephone subscribers of the Rusanovskiy housing area who have access to the computer. This is essentially the first verbal answering system in regular commercial operation in this country..."

For now, the computers are not in entirely unrestricted operation. When the flow of inquiries is especially large, a man works along with it. But from 11 am to 2 pm the computer provides information on its own, as it does also from the middle to the end of each month.

It is easy and pleasant to recall difficulties after they have been overcome. But in 1973 there was nothing to recall: the apparatus necessary for putting the idea into operation did not exist. First, a device was successfully constructed for connecting any telephone with the computer and asking it questions in coded form; for example, what are the charges for such-and-such a subscriber for intercity calls. That was done by specialists of the Republic Computer Center of the Ministry of Communications of the Ukrainian SSR.

But having the computer answer verbally turned out to be a much more complex problem.

It was calculated that in order to carry on a verbal exchange with a human, a computer would require a memory one hundred thousand times larger than that of the largest of today's behemoths.

The computer was not taught to make sense of words addressed to it. However, the specialists did succeed in having the computer respond to coded questions in verbal form.

I admit that it was with some trepidation that I awaited a meeting with a technology that could duplicate one of the most refined creations in nature--the speech mechanism of man. Having not the slightest idea what this device might look like, I let my gaze wander with some curiosity over the metal housings of the apparatus which fills nearly the entire space in the laboratory of the computer center. Finally I was led to a huge frame which had been painted blue. It was half empty. On only a few racks were there electronic units. This was the speech synthesizer.

Seeing my disappointment, the director of the work on constructing the synthesizer, Professor V. Kulya, said:

"What could we do? We were given much less time than nature had for the creation of the human voice apparatus. Therefore the electrical model does not resemble even in external appearance the biological original. We duplicated only the principle of word formation used by man. This is how the roles were distributed. The functions of the 'brain' were given to the computer. Its present memory is sufficient for it to master the rules for combining sounds, to have a modest store of words, and to know how sentences are constructed. Beyond that everything is simple. Calling up the computer 'for a conversation' takes place according to the same principles as the automatic call-up of a telephone subscriber in another city. Without hearing a word from you, the computer knows what is being asked of it. The necessary information on intercity calls from the indicated telephone is retrieved from the computer's memory and is sent to the synthesizer in the form of electrical signals. Here they are transformed into an audio signal. That is how the word is produced..."

New models of the device are now being developed. (The first examples were produced in cooperation with specialists of the Scientific Research Institute for Radio of the Ministry of Communications of the USSR and of the Kiev Institute of Automation of the Ministry of Instrument Building, Automation Equipment, and Control Systems of the USSR.) A number of original assemblies were built which have been patented in several countries. This is the natural result of many years of scientific research work already begun in this country during the 1950's by Prof A. Pirogov and continued by his students.

The synthesizer now weighs 30 kilograms. In the near future microelectronics will make it possible to reduce this weight to 250 grams. Then, with a well developed technology, the cost of production of the synthesizer will not exceed the price of a telephone. It will be possible to equip all telephone exchanges with them and markedly improve the quality of service to subscribers. And this is the chief goal of the experiment performed by the communications people of Kiev.

USSR

UDC 681.3:338.912.12

EFFECTIVENESS OF FUNCTIONING OF THE INDUSTRIAL AUTOMATED MANAGEMENT SYSTEM OF THE UKRAINIAN SSR MINISTRY OF BUILDING MATERIALS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 35-38 manuscript received 3 Jun 76

BABAK, G. V., candidate in economic sciences

[Abstract] An OASU [industrial automated management system] made up of 12 functional subsystems was put into operation in 1975 in the Ukrainian SSR Ministry of the Building Materials Industry. This system solves a total of 218 problems, including 25 planning problems, 76 summary reporting and accounting problems, 42 problems in keeping operating records, control, and analysis, and 75 problems in economic analysis. The subsystems have a standard structure, with the exception of the "Control of Industrial Transport" subsystem, which has been tailored to this industry. The economic effectiveness of this OASU can be determined from the savings gained by reduction in product costs and by the additional profit gained by reducing non-production costs, which do not enter into pricing of the final product. The annual savings from introducing this OASU has been 1.22 million rubles. The payoff period is one year and 10 months. It has reached an NTU [scientific and technical level] of 6 on a scale of 10. This system includes forecasting models for predicting demand for the industry's products, the amount and structure of capital investments, the amount of fixed capital, gross and commodity production, labor productivity indicators, and indicators for capital-output ratio and power-worker ratio, and the like. Forecasting results are used to solve optimization problems relating to development and distribution of production. Optimization of long-term plans for production and capital investments makes it possible to achieve a considerable increment in profit and output of key products over plans developed by traditional methods. Special attention is being devoted to the problem of improving operations management in the industry. Processes of gathering and processing operations data on the production economics of enterprises and associations have been automated. Data control points have been set up for primary processing and transmission of data with automatic entry of data into a "Minsk-22" computer directly via communications channels. "Minsk'22" and "Minsk-32" computers have been brought together to form a complex making it possible to process data with automatic exchange of data. Improvements in operations management have made it possible to increase the even flow of production by approximately seven percent for the industry as a whole and to reduce non-production expenses by 200,000 rubles per annum. The ministry's computing center is doing development work on creating an automated data bank with a unified structure for arrays of planning, statistical, and normative data. A data search system and a remote data processing system [SLOI] will be created, based on the YeS series of computers. Analysis of the functioning of this OASU has demonstrated that the employment of mathematical economic methods and computer technology has become indispensable to practical methods of controlling operations in this industry.

USSR

COMPUTER EQUIPMENT IN THE MANAGEMENT OF SUPPLY AND MARKETING

Moscow MATERIAL'NO-TEKHNICHESKOYE SNABZHENIYE in Russian No 7, 1977 pp 80-85

FISHBEYN, I., deputy chief, Information and Computer Center, "Kompressor" Plant and GENDLER, I., group manager

[Abstract] The Information and Computer Center of the "Kompressor" Plant uses a Minsk-32 computer to perform a group of problems related to the supply of materials and equipment, and marketing as a part of the ASUP [automated management system for an enterprise]. These groups function as two subsystems: material and equipment supply and marketing control. The first subsystem performs calculations as needed for requisitioning materials and component products; calculates the annual, quarterly and monthly requirements for materials and component products; accounts for the movement of material resources through storage facilities; prints out limit cards for each shop for the quantity of materials it can receive according to the monthly plans; analyzes and calculates the coverage of the plan for production of raw materials, including replacements; and calculates the material resources required by the plan. The marketing section provides timely and accurate information concerning marketing agreements in every stage. The functional services of the plant are supplied by the computer with information printed on four different forms. Form 1 reports the conclusion of a contract or agreement. Form 2 contains information on the products which will be produced under the contract or agreement. Form 3 expresses the total number of each type of product which must be produced according to all contracts and agreements then in force. Form 4 relates plan figures to figures calculated on the basis of the file of contracts. Figure 1.

UDC 658.5.011.56:31

USSR

MAIN GUIDELINES FOR FURTHER INCREASING THE EFFECTIVENESS OF WORK ON CREATING AN AUTOMATED SYSTEM FOR STATE STATISTICS FOR THE UKRAINIAN SSR

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 21-26 manuscript received 2 Jun 76

SKRIPNIK, P. M., and OSTAPENKO, A. V., candidates in economic sciences, and MEN'SHIKOV, K. P., engineer

[Abstract] During the years of the Ninth Five-Year Plan phase one of the ASGS [automated system for state statistics] of the Ukrainian SSR was created and put into operation. This system includes 23 system-wide and eight local units for electronic processing of statistical data (EOI), including 13 major functional subsystems. EOI units for the republic and oblast level were created on the basis of "Minsk-22" and "Minsk-32" computers. A standard format for machine processing of statistical data was introduced at the rayon level, making it possible by the end of the Ninth Five-Year Plan to mechanize 85.4 percent of statistical reporting operations at 19 rayon (or urban) IVTs [computing and information centers], 268 rayon (or urban) computing and information stations (IVS's), and 54 rayon (or urban) MSS's [local statistical stations]. At one center or station an average of 17 statistical reporting forms in standard format and as many as nine forms in local format are processed. The computing center network of phase one of the Ukrainian SSR's ASGS covers three administrative levels: The republic, oblast, and rayon. Included in this network are the RVTs TsSU USSR [Republic Computing Center of the Central Statistical Board of the Ukrainian SSR], the computing center of the Kiev City Statistical Board, 25 computing centers of oblast statistical boards, 36 rayon (urban) IVTs's, 347 rayon (urban) IVS's, and 97 MSS's. During the Ninth Five-Year Plan computing centers and stations of TsSU USSR [Central Statistical Board of the Ukrainian SSR] did a considerable amount of work on mechanized processing of statistical data for various ministries, departments, enterprises, and organizations of the national economy. The services of TsSU USSR's computing system were used by more than 19,000 organizations by the end of the Ninth Five-Year Plan. The amount of work done for these organizations amounted to about 37 million rubles, 3.3 times more than at the beginning of the Ninth Five-Year Plan, with the amount of work done by computers in 1975 amounting to more than four million rubles. The hypothetical savings gained by introducing EOI units at the oblast and republic levels amounted to 421,800 rubles. The second phase of the Ukrainian SSR's ASGS will be an integrated system for gathering and processing statistical reporting data, which will use modern mathematical economic methods for analyzing statistical data and data science principles based on utilization of automated data banks. Phase one was restricted, in part, by the necessity of using a hardware complex based on the "Minsk-32" computer. Phase two will be oriented toward the use of YeS series computers. Emphasis is placed here on the necessity of creating a republic-wide automated data bank for the ASGS, as the key element in creating territorial computing centers for multiple use by enterprises and organizations of the republic.

Q. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

THE EFFECT OF INTRODUCTION OF AUTOMATED MANAGEMENT SYSTEM

Moscow SEL'SKAYA ZHIZN' in Russian 24 Sep 77 p 2

KLIMENT'YEV, A., Chairman of Gor'kiy Oblast Association "Sel'khoztekhnika" [Agriculture Technology]

[Abstract] The Oblast "Sel'khoztekhnika" Association is to assume complete responsibility for repair and maintenance for all machines and mechanisms at collective and state farms by the end of the current 5-year plan. This increase in responsibility and centralization of repair and parts-distribution operations has required the development of an AMS [automated management system] for the Association. The task was begun by restructuring the goods distribution network, setting up a supply base in each political rayon, for a total of 48 such bases. All of the centralized supply and repair bases are joined by a single AMS for the entire oblast, which is to take on the responsibility for scheduling of repairs and maintenance of adequate supplies of spare parts. The total savings for the oblast resulting from centralization and automation are expected to reach 500,000 rubles per year.

USSR

AGREEMENT ON AUTOMATION OF SCIENTIFIC RESEARCH SIGNED IN MINSK

Minsk SOVETSKAYA BELORUSSIYA in Russian ["Automata Control the Search"] 30 Jul 77 p 3

[Text] An agreement on long-term scientific-technical cooperation between the Belorussian and Latvian Academies of Sciences in the field of automation of scientific research was signed in Minsk by N. A. Borisevich, president of the Belorussian SSR Academy of Sciences, and E. A. Yakubaytis, vice president of the Latvian SSR Academy of Sciences.

The agreement provides for the development of a methodology for scientific research in physics, chemistry, mechanics, biology, geophysics, and technology with the help of automated systems.

"The agreement is based on the solid foundation of the work already done by Latvian and Belorussian scientists on the problem "Automation of Scientific Research," a BELTA correspondent was told by P. M. Chegolin, dr in technical sciences, chairman of the Scientific Council of the Belorussian Academy of Science. "In Riga we put into operation an original centralized computer system, which simultaneously controls the course of experiments at several institutes. Our colleagues have created interesting equipment for it--the so-called intercomputer communications adapters, which make it possible to coordinate the operation of computers of various generations and types. Specialists of the Latvian Academy of Sciences gave a high rating to the software programs and to certain equipment and instruments for automation of research which were developed by Belorussian scientists and designers. There is no doubt that the agreement, which has been concluded during the year of the 60th anniversary of Great October, will serve the cause of the continued progress of Soviet science and the strengthening of the friendship and brotherhood of the Soviet peoples."

A Department for Automation of Scientific Research has been established at the Institute of Technical Cybernetics, Belorussian SSR Academy of Sciences. This institute has been designated by the agreement as one of the main organizations.

USSR

FIRST USSR COMPUTERIZED MEDICAL DIAGNOSTIC AND MONITORING CENTER DESCRIBED

Moscow LITERATURNAYA GAZETA in Russian ["When Seconds Decide"] No 19, 11 May 77 p 10

FEOKTISTOVA, O., engineer

[Abstract] A description is given of the functions performed by the first USSR computerized medical diagnostic and monitoring center now being used experimentally at the Republic Clinical Hospital imeni Mir-Kasimov in Baku. This "cybernetic revivification center" is unique and was put together from equipment produced entirely in the USSR under the supervision of Professor V. Akhutin, chief design engineer of the Special Design Bureau for Biological and Medical Cybernetics of Leningrad Electrical Engineering Institute. This system makes it possible to use mobile diagnostic apparatus which is rushed to the scene of an accident and to transmit instrument readings by radio to the main computing center. Information on major vital indicators is transmitted by radio to a computer, which is equipped with a memory storing thousands of case histories, on the basis of which it relays back recommendations on treatment and predicts the possible outcome of the patient's condition. Response is practically instantaneous. This enables medical personnel to make a decision on urgency of treatment and to assign treatment priority to those most in danger in the case of multiple victims of an accident. A special telephone hookup is also provided so that information can be relayed to the computer from inside a building. Once the patient's condition is diagnosed and recommendations on treatment are given, this information is stored in the computer's memory, so that the computer can "follow up" on the patient's progress all the way to the point of complete recovery. When the patient is admitted to the hospital all readings of major vital indicators have already been registered. These indicators are also monitored during surgery, where they are displayed in digital form, along with a prognosis of the patient's condition and an estimate of the degree of risk. Continuous automatic monitoring of vital indicators continues in the intensive care unit and in the hospital ward. The monitoring apparatus utilizes contact-type cuffs, clips, and electrodes. The appearance of complicated electronic apparatus in the hopsital necessitated creation of a new engineering department at the hospital. A Department of Medical and Biological Cybernetics has recently been created at the Second Moscow Medical Institute, which, along with the department at the Leningrad Electrical Engineering Institute, will try to solve the problem of a drastic shortage of personnel adequately trained in this new technology.

USSR UDC 681.325

EFFECTIVENESS OF METHODS OF MONITORING INFORMATION FED INTO ELECTRONIC COMPUTERS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 3, 1977 p 9

PEPELYAYEV, A. N., and ZAMYATINA, YE. B.

[Translation of Russian abstract] An analytical method of calculating the effectiveness of monitoring methods is described. The probability of error detection is the indicator of effectiveness. The effectiveness of digital monitoring with respect to modulo is calculated as an illustration of the method proposed. Monitoring methods based on detection of operator errors when recording information on punched tape and punched cards are calculated by the proposed analytical method: accounting monitoring by line and stack, double punching and certain modifications in monitoring with respect to modulo. Tables 3; references 7.

USSR UDC 65.011.56:312.003.13

ECONOMIC EFFECTIVENESS OF AUTOMATING DEMOGRAPHIC CALCULATIONS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 2, Apr/May/Jun 77 pp 1-5 manuscript received 14 Jun 76

KOVALENKO, I. YA., engineer, and POPOVKIN, V. A., candidate in geographical sciences

[Abstract] Automating the broad complex of calculations that are part of constructing the demographic hypothesis in the Ukrainian SSR is evaluated as to the cost-effectiveness of kinds of operations automated by computer. A complex of interrelated programs for demographic forecast on a Ural-14 computer was set up in GlavNIIVTs [Main Administration of Scientific-Research Institute of Computer Centers], Ukrainian SSR Gosplan. Execution of these programs affords a full demographic prediction (by age, sex and urban and rural locality) by oblasts, economic regions and for the republic as a whole over a future 30-year period. Here are the main characteristics of the program complex:

Number of programs	10
Total number of commands in all programs	11,920
Volume of operational memory utilized	$160,000_8$ cells
Volume of initial information (punched cards)	35,000
Volume of external memory	3 ml of 3400_8 zones each
Total number of all files in the program complex	34

Time needed in calculating one variant of UkSSR demographic hypothesis	110 h

USSR UDC 621.395

ORGANIZATION OF DATA TRANSFER IN AUTOMATED MONITORING SYSTEMS FOR AIR POLLUTION

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 2, Apr/May/Jun 77 pp 71-74 manuscript received 3 May 76

SHCHERBAN', A. N., dr in technical sciences, PRIMAK, A. V., and KOPEYKIN, V. I., candidate in technical sciences, and SHILO, N. KH., engineer

[Abstract] Automated monitoring systems for air pollution [ASKZV] are examined as a network for transfer of discrete information: the network includes data transfer equipment [APD] from monitoring-measuring stations [KZS] and the central station [TsS] and communication channels. Urban ASKZV optimally use a network for transfer of discrete information with a driving TsS. The APD must meet these requirements: error coefficient 10^{-5} - 10^{-6} and minimum delay in data transfer (not more than 30 s in the communication session of the KZS with the TsS), for a maximum system capacity of 24 KZS with 14 sensors at each station; the lowest possible outlays for equipment and renting of the communication channels are to be achieved (not more than 1-2 rubles/bit). Figures 1; references 4 (Russian).

USSR UDC 681.3.06

DATA TRANSFER SYSTEM FOR M4030 CONTROL COMPUTER COMPLEX AND FEASIBILITY OF BUILDING A TELEPROCESSING SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3, May/Jun 77 pp 135-140 manuscript received 4 Jan 77

VOSKRESENSKIY, YURIY ALEKSANDROVICH, candidate in technical sciences, INEUM [Institute of Electronic Control Machines, USSR Academy of Sciences], Moscow, and NAUMOV, BORIS NIKOLAYEVICH, corresponding member, USSR Academy of Sciences, INEUM (Moscow)

[Abstract] Remote access to the M4030 control computer complex is predicated on data transfer control devices, interfacers, data transfer units (modulator/demodulators) and terminals. The data transfer control device discussed is a data transfer multiplexer for 12 channels. Allocated telegraph and telephone lines and physical circuits can serve as the data transfer channels. Replaceable interfacer blocks are aggregated in groups, each of four telephone or telegraph interfacers. Data transfer rates over communication channels can be varied by switching in the interfacers from 50 to 9600 bits/second. When the rate of 9600 bits/sec is used in all interfacers, one data transfer control device can simultaneously service up to 15 communication channels. The data transfer range in this case is reduced from 15 km (at a data transfer rate of 200 bits/sec) to 4 km. Figures 5; references 3: 2 Russian, 1 Western.

USSR UDC 025.4.004.14:65.011.56

THE INTRODUCTION OF STANDARDIZED DOCUMENTATION SYSTEMS AND THE STANDARDIZED SYSTEM OF CLASSIFICATION AND CODING OF TECHNICAL-ECONOMIC INFORMATION TO AUTOMATED MANAGEMENT SYSTEMS

Moscow STANDARTY I KACHESTVO in Russian No 7, Jul 77 pp 17-19

MARKOV, I. P., USSR State Standards Commission, SAKOV, A. A., PRIK, A. S., VNIIKI [All-Union Scientific-Research Institute of Information, Classification and Coding]

[Abstract] The ministries and departments responsible for the development of standardized systems of documentation and a unified system for classification and coding of technical and economic information, under the organizational and methodological guidance of the USSR State Standards Commission, have developed 13 standardized documentation systems including state standards and sets of standardized documents (over 1,700 forms), 20 all-union and technical and economic information classifiers, 77 branch information classifiers, plus the all-union classifier for enterprises and organizations. Development of this standardized base has involved extensive utilization of computer technology. A system of state supervision and departmental control of the introduction of standardized documents and classifiers has been created, and will

begin functioning in 1977-78. The theoretic and practical work performed during the Ninth Five-Year Plan has established that technical and economic information classifiers should act to identify objects on a statewide scale, should act as a statewide standardized language for the exchange of information among automated management systems, should be used together with intrasystem classifiers in the solution of intrasystem problems, and should be equipped with translation tables for intrasystem classifier languages. The relationship between all-union branch and enterprise classifier languages is explored. Experimental introduction of the standardized documentation system and standardized all-union technical-information classifiers to the AMS is to be undertaken in 1977, and the results of these experiments will be used to adjust the document and classifier systems as necessary. The article calls for development of standardized forms of documents and standardized information files to be utilized by computer-based automated management systems by 1980. References 5 (Russian).

USSR

AN AUTOMATED INFORMATION SUPPORT SYSTEM FOR TECHNOLOGICAL NORMATIVE DOCUMENTS

Moscow EKONOMICHESKAYA GAZETA in Russian ["Checking an Electronic Computer"] No 33, Aug 77 p 16

[Text] An automated system which provides information concerning NTD [technological normative documents] for engineering services and shops has been created at the Leningrad Association "Elektrosila" imeni Kirov. The computer checks the times for recertification of products, and reexamination of state and branch standards. The computer outputs data to the standardization department 3 months before the end of the effective period of normative documents. This allows the service to restudy in a timely manner the standards and technical conditions for the products produced as well as the standards for materials and component subassemblies in the products. The automated system stores in its "memory" all information on standards documents in the holdings of the Association and informs the engineering service when individual technological normative documents have been annulled or changed.

Information on standards and technical conditions in the standardization branch is recorded on magnetic tape.

USSR

THE COMPUTER AS A BIBLIOGRAPHER

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Aug 77 p 4

[Article by TASS correspondent]

[Text] This library does not have bookstacks or reading rooms. It has only a few units resembling television sets, all of them connected to an electronic computer. Each has a panel with a keyboard, making it possible to converse with the machine.

Let us say you need an article from the newspaper PRAVDA issue of 30 May 1936. You wait only a few minutes, and all of a sudden the text appears on the screen. At the same time, it is copied on a paper roll. This is how the information retrieval system works, as developed by the Institute of Electronics and Computer Technology of the Latvian SSR Academy of Sciences. The new system does not require the use of any code, but provides scientific workers with the possibility of communicating with the computer in any language whose script is based either on the Slavonic or Latin alphabet.

The capacious memory of the computer is capable of being expanded constantly with information from diverse scientific literature. Specialists will be able not only to acquaint themselves with texts of materials they may need, but also to get various items of information.

The plan for the new complex of buildings of the main library of the republic's Academy of Sciences now being built in Riga calls for the inclusion of such an information retrieval center.

USSR

UDC 62-50:007:65.011.56

CONCEPT OF THE FUNCTIONING EFFICIENCY OF AUTOMATED MANAGEMENT SYSTEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 1, Jan/Feb 77 pp 13-20 manuscript received 9 Dec 74; after completion 23 Oct 75

ASHEROV, A. T.

[Abstract] This paper represents a continuation of conceptual studies published earlier in this journal by other authors. The author's purpose is to establish the principles for determining the functioning efficiency of automated management systems (ASU's) and to analyze the gnoseological sources of studies of functioning efficiency. The concept is developed by the deductive axiomatic method and is itself a set of working hypotheses on the subject matter, objectives, and purposes of studying the functioning efficiency of ASU's. The constructiveness of these hypotheses has been tested in creating ASU's at a number of enterprises. The comprehensive theory of management systems employed as a basis here is the functional theory of organization proposed in 1972 by M. I. Setrov, according to which the essence of the organization of systems is disclosed through the principles of compatibility, timeliness of functions, neutralization of disfunctions, concentration of functions, and mobility of functions. Compatibility means that a system should be a finite set of different types of components whose combination makes it possible to form elements of differing complexity, while it is possible at the same time to break the system down and put it together again. Timeliness of functions means that the elements and structures of the developing system continuously possess new properties, and that each property is potentially a function. The degree to which all properties are functional reflects the degree of functioning efficiency of the system and can be expressed mathematically. Thus, any ASU can be defined numerically in terms of its efficiency (organizational level) if the efficiency properties of its elements, present in the system's components, are known and their degree of functionality (the efficiency criterion) is known. Elementary properties should be studied not in isolation but in their interrelationship; in the process of functioning any one element should not interfere with the activity of another; thus, the concept of neutralization of disfunctions. Concentration of functions means that in the process of progressive development each function is subservient to another more general, essential function. Mobility of functions means that the process of functioning aims toward its development, toward a transition to a new higher level. According to this functional approach there are four aspects to the organization of systems: structural, dynamic, informational, and regulatory. The basic propositions on which the concept of functioning efficiency is based are discussed in detail. An ASU is thought of as consisting of two types of components: material and conceptual. Material components are divided into dynamic, technical, anthropological, and ergastic, and conceptual into functional and logical. An important new concept--that of "logical failure" is emphasized. An ASU is regarded as a hierarchical set of goal-directed dynamic, anthropological, ergastic, technical, logical, and functional components between which there exist certain relationships with fixed properties and which possess certain

properties with fixed relationships between them. It is emphasized that the content of the concept "efficiency of an ASU" is not fixed. The breadth of this concept is a function of the number of elementary properties included in the concept of efficiency. A formula is given for the maximum content (breadth) of this concept, in the form of the sum of all elementary properties. The dominant role of economic criteria is confirmed by showing that the most common efficiency criteria should agree with economic criteria. A formula is given for determining the efficiency criterion. A table is given showing which properties must be studied to solve specific types of problems in developing an ASU. Taken into account are problems of a mathematical (software), informational, technical, economic, psychological, legal, personnel, sociological, methodological, and management nature. Practical applications of the concept of the functioning efficiency of an ASU are outlined, among which are the ability now to systematize logically the numerous published studies on this matter and to correlate studies in this area with similar studies of complex systems. This approach also affords the possibility of obtaining new results in studies of economic efficiency. Tables 3; references 15 (Russian).

USSR UDC 62-50

QUANTITATIVE ESTIMATION OF THE EFFECTIVENESS OF ADAPTIVE CONTROL OF TECHNOLOGICAL PROCESSES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 3, 1977 p 11

BYKOV, YU. M., and TROYANOVSKIY, V. M.

[Translation of Russian abstract] Effectiveness of adaptive control in the presence of drift in comparison with a hard stabilization regime: closed analytical expressions which establish the relationship between defining factors in the overall effectiveness of adaptive control, optimum regime parameters, limiting effectiveness and the limits of suitable use of the adaptive system. Figures 4; references 9.

USSR UDC 621.3.019:62-50:519.8

WAYS OF ENSURING THE REQUIRED RELIABILITY OF AN AUTOMATED MANAGEMENT SYSTEM FOR TECHNOLOGICAL PROCESSES (ASUTP)

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 6, 1976 pp 71-74 manuscript received 16 Jun 76

ZARENIN, YU. G., candidate in technical sciences

[Abstract] Determining and ensuring the required level of reliability for an ASUTP in the development stage is one of the main problems of the designer in terms of scope and complexity. Studies relating to this problem have been conducted at the Institute of Automatic Devices in Kiev for the past 10 years, in the course of which a general approach to solving the problem has been developed. This paper is devoted to outlining aspects of this approach, which involves the extensive use of State and industrial standards for introducing developed methods into engineering practice, bringing methods of solving problems concerned with ensuring reliability up to the level of precise engineering techniques and creating handbooks describing these techniques, and creating a library of standard algorithms and programs for automating the entire process of designing reliability into an ASUTP. Extensive use is made of the variant method of solving key problems, which amounts to a repetitive procedure of deriving and evaluating the quality of possible design variants, using the computer to evaluate quality and the designer to analyze results and come up with the next variant. Methods for describing reliability and a system of measures for experimentally determining the level of reliability of component parts have been developed (GOST [All-Union State Standard] 13216-74 and 20699-75). GOST 21705-76 is concerned with problems in the reliability of ASUTP's, and OST [All-Union Standard] 25.456-74 and 25.515-74 regulate the program and sequence for making studies on ensuring the reliability of ASUTP's and stress taking reliability into account when determining economic efficiency indicators for ASUTP's. State-of-the-art ASUTP's are multifunctional systems performing anywhere from two to three to 20 to 25 functions, and these functions can differ substantially in importance and in the structure of hardware and software used to perform them. Therefore, the specifications for the reliability of an ASUTP should be determined individually for each function. Optimization of these specifications should follow economic criteria for the majority of ASUTP's in industry. A number of organizations have been developing an inter-industry "Technique for Standardizing Quantitative Indicators of the Reliability of an ASUTP." A description is given of the general approach underlying this technique, which utilizes the concepts of the "cost of reliability" and the "cost of unreliability." Special languages have been developed to describe the structure of an ASUTP, so that the computer can be used in methods of estimating the reliability of variants of the structure of ASUTP's. Use is being made of analytical methods and the method of statistical modeling to predict the reliability of the technical and algorithmic components of an ASUTP. Studies and analyses of the reliability and efficiency of ASUTP's are also being made under conditions of actual operation in industry. The need for continued participation of the designer in the process of evaluating reliability through the design stage and in the process of actual use of the system in industry is emphasized. References 2 (Russian).

USSR UDC 681.32

ONE METHOD OF ESTIMATING THE REDUNDANCY OF COMPUTER SYSTEMS WITH SELF-REPAIR

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 6, Jun 77 pp 158-166 manuscript received 14 Apr 76

VEDESHENKOV, V. A., VOLKOV, A. F., and SEMENOV, G. B., Moscow

[Abstract] One effective means of increasing the reliability of computer systems involves their reparability and consists in reducing the labor consumption and duration of repair procedures following faults of various types. Frequently, access for servicing is limited, downtime is very expensive and this and many other limitations require that most repair procedures be automated, including the stage of defect elimination. Systems in which this stage of replacement of defective devices with functioning devices is automated are called computer systems with self-repair. A method is suggested for estimating the hardware cost of organization of self-repair as a method of increasing computer system reliability. The method is based on conversion of a number of parameters and of the required reliability of the initial computer system into two generalized parameters τ_p and τ_δ. A two-dimensional diagram is developed with τ_p and τ_δ as its axes, reflecting the area of optimum utilization of built-in, modular or single-character levels of self-repair, which indicate the redundancy required. Figures 2; tables 4; references 6 (Russian).

USSR UDC 338.94:62-52

SOME PROBLEMS OF ENHANCING THE EFFICIENCY OF AUTOMATIC MANAGEMENT SYSTEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3, May/Jun 77 pp 15-19 manuscript received 20 Oct 75; after completion 6 Jul 76

DRUZHININ, VALERIY NIKOLAYEVICH, engineer, PO [Production Association] "Svetotekhnika" [Illumination Engineering], Saransk

[Abstract] Four measures for enhancing production efficiency and product control of second-generation automatic management systems are discussed: concentration and specialization of computer practice; standardization of design solutions; ensuring maximum reliability of input information; and changing the organizational structure of control. Each measure is discussed at length. Concentration and specialization of computer practice is typified by the "Svetotekhnika" Production Association. In ten years (1964-1973) product output rose by 6.4 times; labor productivity--by 2.8 times; production profitability--by 5 times; and profits--by 18 times. Organizationally, computer practice relies on a regional computer center and seven support stations of the automatic control system. Figure 1; references 1 (Russian).

USSR

YOUR VERY OWN WORDS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian [Report from the Institute of Control Systems, Georgian SSR Academy of Sciences: "The Computer Learns to Listen"] 22 May 77 p 4

AROBELIDZE, O., and PIPKO, D., Special Correspondents

[Abstract] Candidate in Technical Sciences Aleksandr Grigor'yevich Kakauridze discusses a robot capable of understanding two dozen or so spoken words such as "Forward," "To the Left," "To the Right," "Backward," and "Stop." This robot utilizes videograms which allow it to analyze its small repertoire of spoken words, regardless of the speaker or his intonation. However, if input devices of this type are to be designed for general-purpose computers, capable of understanding all human speech, videograms are unsuitable, because they require "portraits" of the sounds of all of the words to be stored in the computer. Instead, the computer must be taught to recognize phonemes, and from them to construct and recognize words, sentences, instructions and data.

USSR

THE MAZHINE VANTS TO ZEE YOU

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian (Report from the Institute of Control Systems, Georgian SSR Academy of Sciences: "The Computer Learns to Listen"), 22 May 77 p 4

AROBELIDZE, O., and PIPKO, D., Special Correspondents

[Abstract] A discussion with Candidate in Technical Sciences Aleksandr Grigoryevich Kakauridze is concerned with the difficulty of speech analysis, caused by variations in pronounciation from person to person and even in the same speaker from time to time. An experimental speech analyzer which simply attempts to print out words and sentences spoken into it is discussed, and it is pointed out that although the rate of errors of individual letters is fairly high, the percentage of words which can be understood by an intelligent reader is not as bad as would be expected, and the percentage of sentences which can be doped out by careful analysis is even better, given the advantages of context which sentences provide.

USSR

VOICE PRINTS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian (Report from the Institute of Control Systems, Georgian SSR Academy of Sciences: "The Computer Learns to Listen") 22 May 77 p 4

AROBELIDZE, O., and PIPKO, D., Special Correspondents

[Abstract] Dr in Technical Sciences Guram Solomonovich Ramishvili discusses voice prints with the correspondents. Specialists have created a system called SARG (Sistema automaticheskogo raspoznavaniya golosa). i.e., "automatic voice recognition system." Based on spectral analysis of voices, this machine attempts to identify speakers who record small samples of their voice on magnetic tape. The machine is partially successful in recognizing the voices of speakers even when they attempt to "fool" it, by disguising their voice, although at times the machine does fail to recognize the voice of the speaker. No percentages of recognition are given.

USSR

INTEGRATION--A FURTHER ADVANCE IN AUTOMATED MANAGEMENT SYSTEMS (ANALYTICAL REVIEW OF THE EXHIBITION)

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 4, 1977 pp 53-54

POLOZOV, YU. YE., candidate in technical sciences

[Abstract] A review is given of individual exhibits and reports from the USSR Exhibition of Economic Achievements held during Aug-Nov 1976, particularly of the exhibition "Toward Efficiency of Management" featured there, and of its subdivisions. This exhibition is one of the first to have given a comprehensive picture of domestic achievements in automating management. The exhibition represented a summary of the know-how gained in developing and creating ASU's [automated management systems], showed the achievements made in interrelating automation with the many facets of the field of control, and pointed out the path for future advances in ASU's. Certain conclusions can be drawn from the exhibition. The first is that future advances and improvements in ASU's for different levels of management are impossible without extensive integration of systems making it possible to intertwine methodology, information science, software and hardware, as well as to provide for interaction between problems, subsystems, and entire systems. Unity of principles is needed for creating algorithms and classifiers, and better compatibility of hardware is required. There is an urgent need for theoretical and practical work relating to problems in integrating systems. Integration should be singled out as an intersystem problem, whose solution will make it possible to standardize and unify solutions for systems of the same type. The second conclusion is that standardization of design solutions is the second important problem in making advances in ASU's possible. This should not exclude altering and unifying the structure of document flow and this should be done on a State-wide level, using already tested solutions. This will make it possible to reduce the cost of developing and introducing ASU's for analogous levels of management. The third conclusion is that ASU's must be made highly efficient. An important guideline here is the use of a comprehensive systems method in automating the planning, monitoring, and accounting functions of management. Improvements must be made in methods of estimating the efficiency of an ASU's functioning and of obtaining substantiating economic data. Standardization in the development of systems and of the many problems involving implementation of management functions is necessary. The fourth conclusion is that individual systems within the scope of ASU's must be implemented, in particular a comprehensive system for management of product quality and systems for management of scientific and technological progress. There must be further interaction between different levels of management. Certain components of ASU's should be enlarged to create more comprehensive subsystems, for example, and restructuring of management processes in particular and management in general is necessary in order to have a standardized base for creating efficient structures and minimizing hardware costs. Solution to all these problems is possible only by integrating ASU's. Research should be done in the area of methods of providing economic incentives in the field of management.

USSR

SOVIET UNION AT THE 'ELEKTRO-77' EXHIBITION

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 4, 1977 pp 56-58

SAMOYLOV, YU. M., educationalist and editor of the Soviet section of the "Elektron-77" exhibition

[Abstract] A comprehensive review is given of exhibits at the international "Elektro-77" exhibition held in June 1977 in Sokol'niki Park in Moscow. This was the second international show of electrical equipment and transmission lines, the first having been held in Moscow in 1972. The Soviet Union was the biggest exhibitor, with 19 exhibits. A special section was set aside to exhibit automated electronic complexes, represented by the V5/40 control computer complex, a detailed description of which will be given in the next issue of this journal. The electrical equipment industry has been developing the manufacture of unique drive motors, slow-speed motors with permanent magnets, high-power converter units, high-power semiconductor devices, sensors of technological parameters, logic components, electronic microcomputers, and other equipment for these complexes. The Soviet exhibit also reflects the results of the process of socialist economic integration of the division of labor in the electrical equipment industry of member countries of CEMA. A new step in this process was the creation of "Interelektro," an international organization for economic and scientific and technological cooperation among seven socialist countries--the People's Republic of Bulgaria, the Hungarian People's Republic, the German Democratic Republic, the Polish People's Republic, the Socialist Republic of Romania, CSSR, and USSR. Many items featured at the exhibit were developed jointly by member countries of "Interelektro."

USSR

ALL-UNION CONFERENCE ON "PROBLEMS IN INCREASING THE ECONOMIC EFFECTIVENESS OF AUTOMATED MANAGEMENT SYSTEMS (ASU) FOR ENTERPRISES AND ASSOCIATIONS"

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 5, 1977 pp 59-60

AKHMADEYEVA, N. M., engineer

[Abstract] The All-Union Conference on the above subject, held in Uzhgorod in October 1976 and organized by leading organizations in the instrument-making industry, was attended by over 250 representatives of the industry. (In a number of instances their affiliation is given.) There were discussions of the economic evaluation of the quality and effectiveness of such systems, including questions about the organization of effective functioning of systems, methodological problems in estimating and ways to improve the effectiveness of systems, advantages and features in the creation of systems for Associations and large enterprises and the exchange of accumulated experience in

their creation and operation. The recommendations of the conference emphasized the need to study and improve the methodology of calculations of the economic effectiveness of ASU.

USSR

SEMINAR ON THEORY OF AUTOMATA

Riga SOVETSKAYA LATVIYA in Russian ["An Automaton in a Miniature Crystal"] 11 Sep 77 p 2

[Text] An International Seminar on the Theory of Automata will open 12 September in Riga. Its participants will discuss practical applications of the results of the research which has been conducted jointly by the staffs of three scientific centers--the Institute of Information Transmission Problems of the USSR Academy of Sciences, the Institute of Electronics and Computer Technology of the Latvian SSR Academy of Sciences, and the Institute of Technical Cybernetics of the Bulgarian Academy of Sciences.

In a conversation with a correspondent of LATINFORM, the vice president of the Latvian SSR Academy of Sciences, E. A. Yakubaytis, observed:

"One cannot help but see substantial qualitative changes not only in the design of computers but also in their functions. The center of gravity is ever more markedly shifting from pure computing processes to the processing of information and to ways of converting it and transmitting it to consumers. In contemporary computer technology the leading role will belong to apparatus which operates on the principles of mathematical logic."

The Soviet and Bulgarian specialists concentrated their efforts on further enhancing the effectiveness of such equipment. It must be said that in recent years significant achievements have been made in miniaturization and in increased reliability and rapid operation of logical devices based on the so-called large integrated circuits. These "large circuits" are contained in midget semiconductor crystals (several square millimeters in size), each of which will sometimes contain more than 10,000 transistors. In essence, any such small crystal must be viewed as a general-purpose automaton, which needs only be adjusted in order to fulfill this or that function. The new methods which will be the topic of discussion at the seminar are making this possible. The scientists are now developing highly complex logical systems made from a collection of uniform blocs.

USSR

CONFERENCE ON CONTROL PROBLEMS IN MINSK

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 9, 1977 pp 140-141

[Abstract] The Seventh Conference on Control Problems will be held in Minsk this November. The conference, which will last 3 days, is sponsored by the Institute of Control Problems of the USSR Academy of Sciences, the Institute of Technical Cybernetics of the Belorussian SSR Academy of Sciences, and the USSR National Committee on Automatic Control.

C. Personalities

USSR

DEATH OF B. I. PUCHKIN ANNOUNCED

Novosibirsk AVTOMETRIYA in Russian ["Boris Ivanovich Puchkin"] No 2, Mar/Apr 77 p 132

[Abstract] Candidate of Technical Sciences Boris Ivanovich Puchkin, one of the founders of the journal Avtometriya and a member of its editorial board, died on 25 November 1976 at the age of 55. He had worked since 1963 as head of a laboratory in the Institute of Automatics and Electrometry, Siberian Department of the USSR Academy of Sciences, where he also served as scientific secretary of the Presidium and helped organize many major conferences, as well as Soviet and foreign exhibits of instruments and equipment.

USSR

EDITOR OF PROGRAMMING JOURNAL APPROVED

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 9, 1977 pp 137-139

[Abstract] N. N. Govorun, corresponding member of the Academy of Sciences USSR, has been approved as chief editor of the journal Programmirovaniye [Programming] of the Academy of Sciences USSR.

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